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How Does Psychopathology Impact the Trajectory From State to Trait Mindfulness?

Veronica O'Brien

HOW DOES PSYCHOPATHOLOGY IMPACT THE TRAJECTORY FROM STATE TO

TRAIT MINDFULNESS?

By

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(Under the Direction of Nicolette Rickert, PhD)

ABSTRACT

Previous research has found that higher levels of trait mindfulness protect against

psychopathology (e.g., Chiesa & Serretti, 2013; Desrosiers et al., 2013; Sevilla-Llewellyn-Jones

et al., 2018); however, the research on state mindfulness and psychopathology is more mixed.

These mixed findings suggest that some clients with higher levels of psychopathology may have

greater difficulty engaging with mindfulness practice thereby hampering their progression

towards trait mindfulness and its associated benefits. The present study sought to explore how

psychopathology (i.e., anxiety, trauma, alcohol use, and depression) relates to the growth of state

and trait mindfulness. The present study recruited 274 participants from a southeastern university

and the local general population. Participants completed a four-week online and asynchronous

mindfulness-based stress reduction course and answered surveys each week related to their

mindfulness levels; in the baseline and final surveys, they were also asked about their

psychopathology. A latent growth curve model was constructed to understand the pathways of

state and trait mindfulness growth. The primary findings related to the hypotheses included: (1)

the growth of state mindfulness predicted final trait mindfulness, and (2) baseline anxiety

predicted a steeper decline in state mindfulness over the mindfulness course. Taken together,

these findings help contribute to our understanding of the growth of state mindfulness and how anxiety may interfere with its trajectory in psychotherapy.

INDEX WORDS: Trait mindfulness; State mindfulness; Rurality; Psychopathology; Anxiety

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DEDICATION

To my husband, CJ, you've been my rock for over 12 years, and I could not be the person I am today without your unwavering support or love. To my cats, I will always love you and provide for you. You will never have to go without rabbit chunks.

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There are many people who have supported me throughout my journey of obtaining a doctorate in clinical psychology, and I would not be where I am without them. To my mom and Kevin, you both have listened to me talk endlessly about my anxieties and have provided an endless amount of love and support as I've worked towards my goals. To my mentor and dissertation chair, Dr. Nicolette Rickert, I feel unbelievably grateful to have found you as a chair. You consistently supported all of my ambitious research goals and this project would never have been possible without you. I cannot express enough gratitude for your teaching and compassion during the dissertation process. To my best friend and cohort-mate, Danielle, you are the reason I made it through the doctoral program. You provided me with friendship and empathy during the hard times, along with constant laughter and silliness during the good times. Lastly, to my brothers, Sean and JJ, sister, Kenny, and cousins, Jenn and Jess, I love you all dearly and am so fortunate to have you as my family; if we weren't family, I would still choose you to be in my life.

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INTRODUCTION

Problem Statement

In the past decade, research on mindfulness has soared. Toniolo-Barrios et al. (2020) conducted a bibliometric analysis on the journal "Mindfulness" and found a significant increase in empirical research on mindfulness from 2015 to 2019 compared to 2010 and 2014. Moreover, the Centers for Disease Control and Prevention (CDC, 2018) reported meditation, the tool used to practice mindfulness, was the fastest growing health trend that year. Mindfulness-based interventions (MBIs) continue to grow in popularity and are frequently used in clinical practice (CDC, 2018). When individuals engage in an MBI, they enter state mindfulness and research suggests continued access to state mindfulness can lead to trait mindfulness (Kiken et al., 2015). Trait mindfulness is widely documented as a protective factor for psychopathology; given this desirable quality, researchers have started to explore the trajectory from state to trait mindfulness to understand its growth (Kiken et al., 2015; Polizzi et al., 2018). Despite the proposed benefits of trait mindfulness, some research has found mixed results on MBIs' effectiveness at mitigating symptoms of anxiety, alcohol use, trauma, and depression (e.g., Banerjee et al., 2018; Goldberg et al., 2021; Li & Bressington, 2019; Ritvo et al., 2021). These findings suggest certain psychopathologies may hinder one's ability to access state mindfulness, which disrupts their ability to move towards trait mindfulness. To further understand this issue, the proposed research aims to identify how psychopathology (i.e., anxiety, depression, alcohol use, or trauma) predicts the trajectory of state to trait mindfulness.

Review of the Literature

Mindfulness History

Though there is an increasing surge in mindfulness research and interest, the concept of mindfulness dates back 2,500 years ago to Indian Buddhist traditions using the word *sati*, which means "awareness, attention, or alertness" (Nisbet, 2017, para. 6). Wilson (2014) explored the history of mindfulness and found breath-focused techniques similar to sati in Tibetan Buddhism and Japanese Zen meditation, or *zazen*. Buddhism and its various schools have mindfulness embedded, but the representation, understanding, and practice of mindfulness is not monolithic (Purser & Milillo, 2014). Though there are a variety of conceptualizations of mindfulness found under the umbrella of Buddhism, there is a clear commonality found for the function of mindfulness; a salient goal in Buddhist practice is to eliminate suffering and mindfulness is the tool used to meet that goal (Purser & Milillo, 2014).

Wilson (2014) documented the rise of mindfulness practice in America. He stated Westerners were interested in the practice of Buddhism, and subsequently mindfulness, but mindfulness practice through meditation was not introduced in America until 1976. Joseph Goldstein, Jack Kornfield, and Sharon Salzburg studied Buddhism in South Asia before creating the first institution for mindfulness in the United States in 1976. They founded the Insight Meditation Center in hopes of emulating their Buddhist training experience. However, rather than providing well-rounded instruction, they honed in on the mindfulness meditation piece by integrating it with elements of Westernized psychological concepts (i.e., individuals must be helped by another person).

The most influential figure in Western mindfulness is Jon Kabat-Zinn, who developed the well-known Mindfulness-Based Stress Reduction (MBSR) course in 1979 at the University of

Massachusetts Medical School. Kabat-Zinn was introduced to mindfulness meditation while studying for his doctorate and later studied mindfulness with Thích Nhât Hanh at the Insight Meditation Center (Laibowitz, n.d.). Wilson (2014) noted MBSR became popular because the eight-week structure accommodated peoples' busy lives and made the practice of mindfulness accessible. The research surrounding MBSR has been positive, with studies showing it alleviates multifarious psychopathologies (e.g., anxiety, depression, pain, etc.) across diverse populations (e.g., veterans, older adults, students, clinical and community populations, e.g., Grossman et al., 2004; Khoury et al., 2015; Sharma & Rush, 2014) Because of the success related to MBSR, several other psychotherapies were created with mindfulness-based interventions (MBI) embedded into their theoretical orientation such as Mindfulness-Based Cognitive Therapy, Acceptance and Commitment Therapy, Dialectical Behavioral Therapy, or stand-alone MBIs (Baer, 2015). MBIs can take many forms with either formal practice (e.g., body scan, sitting) or informal practice (e.g., engaging in mindfulness behaviors during everyday life activities).

Mindfulness Definition

Similar to Buddhism, the Western conceptualization of mindfulness has not agreed upon an operational definition. One of the earliest definitions of mindfulness stems from Kabat-Zinn (1994) who defined mindfulness as "paying attention in a particular way, on purpose, in the present moment, and nonjudgmentally" (p. 232). Bishop et al. (2004) attempted to operationalize mindfulness by proposing a dual-component model encompassing increased attention and the orientation to one's experience. More specifically, Bishop et al. (2004) stated mindfulness involves the "self-regulation of attention…allowing for increased recognition of mental events in the present moment" (p. 232). Thus, the first component of mindfulness is intentionally bringing attention to the present moment. The second component involves "an orientation that is

characterized by curiosity, openness, and acceptance" (p. 232). Thus, during mindfulness, individuals notice their present moment experience openly without judgement. Later, Shapiro et al. (2006) extended Bishop et al.'s (2004) model by proposing a three-component model to explain how mindfulness results in positive change. Shapiro et al. (2006) retained the attention and orientation components proposed by Bishop et al. (2004) and added the component of intention. Shapiro et al. (2006) stated that while conceptualizing an operational definition for mindfulness, we must consider the intention of *why* the person is engaging in mindfulness as this can help explain the outcome.

From these definitions, there are commonalities that make up the basis of mindfulness: (a) increased attention of the present moment, (b) noticing the present moment without judgement, and (c) intentionality. These components are observed in both state and trait mindfulness and will serve as the foundational conceptualization for the proposed research.

State Mindfulness vs. Trait Mindfulness. The goal of engaging in MBIs is to cultivate state mindfulness, or "temporary changes in the condition in the brain and the corresponding pattern of activity or connectivity" (Tang et al., 2015, para. 4). State mindfulness occurs when an individual is intentionally attending to the present moment without evaluation of their experience, and this is achieved through an engagement with an MBI (Shapiro et al., 2011).

State mindfulness occurs through intentional practice, but Brown and Ryan (2003) argued mindfulness can also be "a naturally occurring characteristic," or a trait (p. 822). Trait mindfulness, sometimes referred to as dispositional mindfulness, is a personality trait that encompasses mindfulness-components. Tang and Tang (2020) define trait mindfulness as one's "innate capacity of paying and maintaining attention to present-moment experiences with an open and nonjudgmental attitude" (p. 15). Moreover, Baer et al. (2006) identified five facets of

trait mindfulness: (a) nonjudgment, (b) nonreactivity, (c) acting with awareness, (d) observing, and (e) describing. Chien et al. (2020) further defines these facets as:

- **Nonjudgment:** taking a non-evaluative stance toward internal thoughts and feelings.

- **Nonreactivity:** allowing emotions and thoughts to come and go, without being impacted by them.

- **Acting with awareness:** attending to what is happening in the present.

- **Observing:** noticing or attending to internal feelings and thoughts and external stimulation.

- **Describing:** labeling feelings, thoughts, and experiences with words (p. 2).

Researchers have explored the development of trait mindfulness and have found that it develops under two conditions: positive parent-attachment style during childhood and a consistent practice of MBIs (Kiken et al., 2015; Warren et al., 2021).

While state mindfulness and trait mindfulness are connected, it is important to note that trait mindfulness does not always match state mindfulness. Bravo et al. (2018) conducted research on the relationship between state and trait mindfulness using a sample of 299 college students. In their study they had participants complete a trait mindfulness measure, engage in a mindfulness induction task, and then complete a state mindfulness measure. By breaking their sample down into novice and experienced meditator groups, they found participants with meditation experience had a stronger positive relationship between their state and trait mindfulness levels compared to participants without mindfulness experience. Bravo et al.'s (2018) findings suggested that increased mindfulness practice can strengthen state mindfulness leading to growth in trait mindfulness.

Mechanisms of Action for Mindfulness

Researchers have explored the mechanisms of action underlying MBIs to understand how the intervention affects psychopathology. Two papers by Coffey et al. (2010) and Hölzel et al. (2011) theorize the mechanisms by which mindfulness mediates psychopathology. Coffey et al. (2010) proposed three mechanisms to explain how mindfulness relates to psychopathological outcomes: (a) emotional regulation, (b) decreased rumination, and (c) non-attachment. Hölzel et al. (2011) proposed four mechanisms of action for mindfulness: (a) attention regulation, (b) body awareness, (c) emotion regulation, and (d) change in perspective on self. Both frameworks will be used to describe the mechanisms of action that mediate the relationship between state mindfulness and reduced psychopathology.

Through engagement with MBIs, individuals maintain their *attention* on an object, such as the breath, and disregard distractions. Hölzel et al. (2011) posited that strengthening attention capabilities through state mindfulness practice can aid in psychopathology with attention deficiencies (e.g., attention-deficit/hyperactivity disorder). Coffey et al. (2010) echoed the proposed mechanism by stating maintained attention to an object decreases rumination, or persistent repetitive and negative thoughts because individuals are focusing on maintaining their attention on the single identified object. Rumination is commonly associated with anxiety and depression, so through the proposed theories, the component of maintained attention can mitigate anxiety and depression (Coffey et al., 2010; Hölzel et al., 2011; Michl et al., 2013). However, Hölzel et al. (2011) stated individuals require a degree of foundational attention regulation to stay engaged in mindfulness enough to build on attention capabilities. The proposed study hypothesizes that the inability to sustain attention can reduce the likelihood of anxiety and depression mitigation.

A secondary proposed mechanism for state mindfulness is *body awareness*. Hölzel et al. (2011) stated "the focus of attention is usually on an object of internal experience: sensory experiences of breathing, sensory experiences related to emotions, or other body sensations" (p. 541). Researchers such as Price et al. (2019) have stated increased body awareness is necessary for substance use disorder recovery as it allows individuals to recognize cravings and work to address the cravings rather than react to them. Additionally, body awareness allows individuals to gain greater awareness of their emotions, which is a prerequisite for emotional regulation.

Thirdly, Hölzel et al. (2011) and Coffey et al. (2010) proposed *emotion regulation* as a mechanism for mindfulness. Emotion regulation is a person's ability to react and respond to emotional experiences appropriately and a variety of mental health disorders have emotion dysregulation as symptom (e.g., depression, posttraumatic stress disorder, anxiety disorders, etc.; Rolston & Lloyd-Richardon, 2016). Hölzel et al. (2011) split the mechanism of emotion regulation into two subcategories: (a) reappraisal and (b) exposure, extinction, and reconsolidation. Garland et al. (2011) stated that through MBIs, stressful events are reappraised as beneficial, harmless, or meaningful. Thus, mindfulness practice can positively reappraise negative emotions (Hölzel et al., 2011). The second subcategory proposed by Hölzel et al. (2011), exposure, extinction, and reconsolidation, is based on the premise that during mindfulness practice, individuals expose themselves to whatever comes up and they do not judge the experience or react. As individuals face negative affect and engage in nonjudgmental awareness, they decondition the negative emotional reaction and thereby extinguish the negative affect. Coffey et al. (2010) labeled this mechanism as non-attachment. Individuals who attach to goals or outcomes may overly rely on the result for happiness; state mindfulness promotes a detached mindset allowing individuals to notice what comes up in the present moment without

overly relying on a particular outcome. Researchers such as Carmody & Baer (2008) stated the nonreactivity and subsequent extinction are mediators for mindfulness and stress-reduction.

Finally, Hölzel et al. (2011) proposed *change in perspective on the self* as the final mechanism of mindfulness. Individuals may perceive their mental state as permanent and unchanging, but by engaging with a static perception of oneself, they are causing psychological distress. Instead, Hölzel et al. (2011) stated through mindfulness skills, individuals learn to take life moment by moment and view unpleasant events as transient.

The mechanisms of action for trait mindfulness are similar to state mindfulness. For example, Burzler et al. (2018, p. 469) found the relationship between "trait mindfulness and mental health symptoms were mediated by emotion regulation, body awareness, and a less static perspective of the self," which are mechanisms labeled by Hölzel et al. (2011). However, trait mindfulness' impact on psychopathology can also be viewed through the lens of the five facets listed above. For example, Carpenter et al.'s (2019) meta-analysis found the trait mindfulness facets of nonjudgment ($r = -0.48$) and acting with awareness ($r = -0.47$) were the most correlated with anxiety, depression, and trauma symptomology. These findings suggested that higher levels of nonjudgment and acting with awareness protect against anxiety, depression, and trauma symptomology.

Taken together, the mechanisms of action proposed by Hölzel et al. (2011) provide a framework for viewing the mediating role of state and trait mindfulness' mechanisms on psychopathology. From the framework, order of skill development is necessary, as the authors' stated attention is foundational and without it, the other mechanisms may not flourish. Additionally, while the authors noted attention-deficit symptomology would benefit from the mechanisms of maintained attention training, there may be challenges in accessing maintained

attention, preventing the observed benefits of mindfulness from manifesting in certain populations, which is a theory supported in the mixed results found in state mindfulness literature on psychopathology.

Mindfulness and Psychopathology

Both state mindfulness and trait mindfulness are thought to mitigate and protect against psychopathology within research (e.g., Chiesa & Serretti, 2013; Hopwood & Schutte, 2017; Kuyken et al., 2015; McLaughlin et al., 2019; Polizzi et al., 2018; Sevilla-Llewellyn-Jones et al., 2018). For example, Polizzi et al. (2018) found an inverse relationship between trait mindfulness and psychopathology (i.e., anxiety, depression, and neuroticism), and McLaughlin et al. (2019) found that trait mindfulness acts as a protective factor against emotional dysregulation.

State Mindfulness and Anxiety. As noted above, Western mindfulness, as it was reconceptualized by Jon Kabat-Zinn, was conceived to mitigate stress, a precursor for anxiety. Hölzel et al. (2011) believed that increased attention and emotional regulation were the mechanisms of state mindfulness most involved in mitigating symptoms of anxiety. Despite the proposed mechanism of action for mindfulness and anxiety, the literature on MBI's effectiveness in attenuating anxiety has had mixed results.

Many researchers have found evidence to support the use of MBIs for anxiety. For example, Sevilla-Llewellyn-Jones et al. (2018) conducted a meta-analysis on 12 studies that implemented a web-based mindfulness program using participants with an anxiety diagnosis. They found a clear reduction in anxiety symptoms with the implementation of state mindfulness interventions. Similarly, Fumero et al. (2020) also conducted a systematic meta-analysis using 12 previously published meta-analyses that looked at various MBIs –in person and online –and

anxiety disorders. Their findings showed positive results for mindfulness in nine of the twelve meta-analyses examined.

However, Li and Bressington (2019) conducted a meta-analysis to explore the effect size of mindfulness-based stress reduction programs on anxiety. Based on the six studies included in the meta-analysis, there was no clear evidence that the MBSR program effectively reduced anxiety-related symptoms. Additionally, Banerjee et al. (2018) conducted research on MBIs using participants with anxiety and found rumination and worry predicted psychological disengagement. They speculated these symptoms may hinder one's ability to cultivate state mindfulness (Banerjee et al., 2018). Interestingly, Hölzel et al. (2011) stated the mechanism of attention in mindfulness practice is linked to reduced rumination. Thus, it is likely that individuals with higher rumination may struggle with accessing sustained attention and thus are unable to engage fully in the MBIs. The proposed study hypothesizes that higher levels of anxiety will relate to lower state mindfulness levels based on the recent results of MBIs and anxiety. Moreover, it is hypothesized that individuals with lower trait mindfulness will have a slower trajectory toward higher state mindfulness.

Trait Mindfulness and Anxiety. Several researchers have studied the relationship between trait mindfulness and anxiety specifically. Desrosiers et al. (2013) examined the relationship between anxiety and the five facets of mindfulness using 187 adults from a treatment facility. They found an inverse relationship between acting with awareness, nonjudgement, and nonreactivity with general anxiety symptoms. While Cash and Whittingham (2010) only found nonjudgment as a predictor for anxiety, they found a similar result in undergraduates and experienced meditators. Finally, Carpenter et al.'s (2019) meta-analysis revealed statistically significant correlations between all five facets and anxiety with varying intensities.

Nonjudgment, followed by acting with awareness and nonreacting, where the strongest inversely correlated facets with anxiety (r = -0.49, -0.48, and -0.31, respectively). Taken together, these results appear to suggest that acting with awareness (i.e., attending to what is happening in the present), nonreactivity (i.e., allowing emotions and thoughts to come and go, without being impacted by them), and nonjudgement (i.e., taking a non-evaluative stance toward internal thoughts and feelings) are the strongest protective facets against anxiety.

As Hölzel et al. (2011) noted, the mechanisms of mindfulness that disrupt anxiety are increased attention and emotional regulation. From the lens of trait mindfulness, acting with awareness relates to the mechanisms of increased attention as individuals are generally more aware of their environment due to increased attention. Moreover, nonreactivity and nonjudgment relate to emotional regulation. Hölzel et al. (2011) defined emotional regulation as one's ability to appropriately react and respond to internal stimuli and when someone has innate capabilities to *not* react and *not* judge their inner experience, they may be demonstrating appropriate emotional regulation. Thus, it appears the same mechanisms that may disrupt one's ability to achieve state mindfulness may also impact one's ability to have trait mindfulness.

State Mindfulness and Depression. Multiple researchers have demonstrated state mindfulness' benefits in mitigating depression-related symptoms (e.g., Greeson et al., 2015; Kuyken et al., 2015; Ma & Teasdale, 2004). For example, Kuyken et al. (2015) conducted a randomized control trial comparing the effectiveness of mindfulness-based cognitive therapy and antidepressants on depression using people who had three or more major depressive episodes. They found no difference in the effectiveness of either intervention, but both were associated with positive outcomes in terms of depressive episode relapse and residual symptoms. Similarly, Ma and Teasdale (2004) also conducted a randomized control trial to compare the effectiveness

of treatment as usual and treatment as usual plus mindfulness-based cognitive therapy within a clinical sample. They found patients who underwent the treatment as usual plus mindfulness-based cognitive therapy condition reduced the likelihood of depression relapse from 78% to 36%. Finally, Greeson et al. (2015) found that MBSR reduced depression symptoms in a sample of adults with varying religious affiliations, sex, or age. In addition to these positive findings, Creswell (2017) also argued the strongest evidence for MBIs stems from its effectiveness in reducing depression symptoms.

Despite these positive results, researchers such as Ritvo et al. (2021) found non-significant differences in depression with mindfulness-interventions. Specifically, Ritvo et al. (2021) recently conducted a randomized controlled trial to test whether a virtual eight-week mindfulness program would reduce depression in a college sample and found evidence to support their null hypothesis. It is also possible that there are more unpublished studies due to the file drawer phenomenon in psychology (Bambacus & Conley, 2021).

Trait Mindfulness and Depression. Similar to anxiety, there is a breadth of research on trait mindfulness as a protective factor for depression. Desrosiers et al. (2013) also examined the relationship between facets of trait mindfulness and depression in a sample of adults from a clinical setting. They found an inverse relationship between nonjudgment, nonreacting, acting with awareness, and describing with general depression symptomology. Carpenter et al.'s (2019) meta-analysis replicated the results of Desrosiers et al. (2013) by revealing a strong inverse relationship between acting with awareness, nonjudgment, nonreacting, and describing ($r = -0.48, -0.48, -0.33, -0.32$, respectively). Further, Raphiphatthana et al. (2016) explored facets of mindfulness on specific symptoms of depression using college students and found an inverse relationship between acting with awareness and nonjudgement with anhedonia and between

nonreacting, nonjudgment, and acting with awareness with negative affect. Describing was not a statistically significant correlate to depression in their findings.

The results from previous literature show a consistent inverse relationship between acting with awareness, nonjudgment, nonreacting and depression, which are similar to the findings for anxiety and trait mindfulness research. Given the overlap in symptomology between the two disorders (Goodwin, 2015), this similarity is not surprising. Thus, a disruption in the mechanisms of attention and emotion regulation due to depression psychopathology are theorized to have similar outcomes on trait mindfulness development as anxiety might. Hölzel et al. (2011) theorized that MBIs reduce depression symptomology through the mechanisms of emotional regulation and increased attention. Thus, someone with higher levels of depression may struggle to access MBIs due to poor attention abilities. Moreover, while multiple researchers have found MBIs were effective in reducing depression, it is unclear whether individuals with depression faced more challenges when accessing state mindfulness and if the challenges caused slower trajectories to depression mitigation.

State Mindfulness and Trauma. Trauma symptoms (e.g., derealization, unwanted distressing memories, nightmares, difficulty experiencing positive emotions, etc.) can have devastating effects on wellbeing (Downey & Crummy, 2022; Mayo Clinic, 2018). In the Diagnostic and Statistical Manual of Mental Disorders (DSM-5), there are multiple disorders relevant to trauma such as reactive attachment disorder, post-traumatic stress disorder (PTSD), and acute stress disorder. Additionally, some disorders such as dissociative identity disorder (DID) and borderline personality disorder (BPD) are theorized to come from childhood trauma. Moreover, 70% of adults across the world have experienced some type of traumatic event, making trauma an extremely prevalent concern in mental health (Benjet et al., 2016). With the

prevalence of trauma-related disorders, many clinicians have turned to MBIs to cut through trauma-related symptomology.

Researchers have tested MBI's effects on trauma-related symptoms with mixed results. Hopwood and Schutte's (2017) meta-analysis on MBIs on post-traumatic stress symptoms found that mindfulness-based treatments were more effective than control conditions (Hedges g = -0.44), even after using methods to account for the file drawer problem and nonsignificant results that may have biased their results. Despite Hopwood and Schutte's (2017) promising results on MBIs and trauma, recently Goldberg et al. (2021) found that adverse childhood experiences were related to increased occurrences of an unfavorable MBI experiences. These inconsistent findings make it unclear how trauma symptoms relate to one's ability to cultivate state mindfulness.

Trait Mindfulness and Trauma. Additionally, researchers have sought to understand the relationship between trait mindfulness and trauma-related symptoms. For example, Kratzer et al. (2018) conducted research on a clinical sample to determine the continuum of trait mindfulness deficits in psychopathology. They found the lowest trait mindfulness levels in individuals with dissociative identity disorder, borderline disorder, and post-traumatic stress disorder, respectively. In addition, levels of trait mindfulness were lower for participants with trauma-related disorders compared to those with anxiety or depression-related disorders. Finally, Harper et al.'s (2022) meta-analysis explored the relationship between specific facets of trait mindfulness and PTSD-symptomology using 16 datasets with different types of samples (e.g., community and clinical). They found statistically significant inverse relationships (highest to lowest) between nonjudgement, acting with awareness, describing, and nonreacting with PTSD. These findings may suggest difficulties with developing trait mindfulness as a result of trauma;

therefore, we hypothesize MBI training will be more challenging for people with a history of trauma.

State Mindfulness and Substance Use. Alcohol use on college campuses remains a pertinent issue, and researchers have explored how mindfulness relates to alcohol use; specifically, MBIs have been used to address binge drinking behaviors in college students. Memelstein and Garske (2015) recruited 76 undergraduate students and led them through a 60-minute MBI. They found that participants reported significantly less binge drinking behaviors four weeks after they engaged with the MBI which suggests MBIs are effective at reducing binge drinking. Additionally, Sancho et al. (2018) found MBIs reduced the risk of relapse in a community sample who struggle with alcohol use. Despite these positive findings on MBIs effects on alcohol use, college students often drink as a way to cope with anxiety or depression (e.g., Mohr et al., 2021). If the primary issue faced by the student is anxiety or depression-related and they drink to cope with those symptoms, then MBIs may not always result in alcohol consumption reduction because as discussed above, the literature on MBIs effectiveness with anxiety and depression is mixed.

Trait Mindfulness and Substance Use. The research on substance use and trait mindfulness is vast as researchers have explored trait mindfulness' relationship between unique substances across varying populations (e.g., college students, community members, and clinical samples). However, for the purpose of the proposed project, the exploration of literature on substance use and trait mindfulness will be limited to alcohol use given that it is one of the most prevalent substances used on college campuses (Arria et al., 2017; Welsh, 2019). Additionally, Karyadi et al. (2014) found that the relationship between trait mindfulness and substance use is strongest for alcohol use behaviors.

In general, college students with higher trait mindfulness have less problematic alcohol use and less alcohol-related consequences (Brett et al., 2017; Karyadi & Cyders, 2015). In alcohol-related studies using emerging adults, the highest correlated facets of trait mindfulness linked to decreased substance use are acting with awareness, nonjudgement, nonreactivity, and describing (Bronchain et al., 2021; Single et al., 2019). However, these facets may involve complex relationships depending on the sample. For example, Brooks et al. (2019) found an inverse relationship between drinking-related problems and acting with awareness, but a positive relationship with drinking-related problems and nonjudgement. Brooks et al. (2019) hypothesized that for trait mindfulness to be a protective factor against substance misuse, a high level of the facet nonjudgment needs to be paired with a high level of acting with awareness; however, the authors state further research is needed to explore the necessary combination of trait mindfulness facets related to lower alcohol use. Still, their findings highlight the important issue of understanding how trait mindfulness develops from MBI practice.

Summary of Literature on Mindfulness and Psychopathology. Mindfulness has received widespread attention to explore its effects on various aspects of psychopathology. From the literature review above, it appears trait mindfulness acts as a protective factor for psychopathology; however, there are mixed results on state mindfulness' impacts on psychopathology. One possible explanation for this difference may be that state mindfulness takes intentional mindfulness practice, which can be challenging if individuals struggle with settling into the practice. Given what is known about the symptoms present in anxiety, depression, trauma, and alcohol misuse psychopathology (e.g., difficulty concentrating and restlessness), it is possible there may be interference with accessing state mindfulness, subsequently impacting one's trajectory from state to trait mindfulness.

The Trajectory from State to Trait Mindfulness

Though relatively unexplored, researchers have studied the trajectory from state to trait mindfulness and found that with continued practice of state mindfulness, one can enhance their trait mindfulness (e.g., Cox & McMahon, 2019; Kiken et al., 2015). In Cox and McMahon's (2019) study, participants completed a 16-week yoga class and the researchers found gradual increases in both state and trait mindfulness throughout the course. However, the landmark study on state to trait mindfulness comes from Kiken et al. (2015), who were one of the first to measure the trajectory from state to trait mindfulness. They used a sample of community members who were enrolled in an in-person, eight-week MBSR program. Using the Five Facets of Mindfulness Questionnaire (FFMQ) to measure trait mindfulness and the Toronto Mindfulness Scale (TMS) to measure state mindfulness, the researchers collected data on trait and state mindfulness each week. Additionally, they collected data on psychological distress using the Symptom Checklist 90. Utilizing latent growth curve modeling, their results yielded two important findings: (a) individuals with greater rates of increasing state mindfulness also had greater rates of increasing trait mindfulness, and (b) growth in state mindfulness levels negatively predicted psychological distress level.

These studies have provided evidence that trait mindfulness is modifiable with MBIs focused on facilitating state mindfulness. However, Kiken et al. (2015) noted that individuals in their study had individual differences in their growth of state and trait mindfulness, suggesting there are factors contributing to the development of this trajectory. As previous research has found, trait mindfulness often acts as a protective factor for many psychopathologies, so there is a need to continue in the exploration of the development of state to trait mindfulness by determining potential barriers preventing or impeding the growth of trait mindfulness. More

specifically, it is hypothesized that psychopathology (i.e., anxiety, depression, trauma, substance use) may inhibit the development from state to trait mindfulness due to individuals' inability to maintain attention or their lack of motivation, which may prevent access to state mindfulness, a mindset necessary for building trait mindfulness. In addition to understanding the barriers to accessing state and subsequent trait mindfulness, there is a need to understand how more accessible mindfulness programs (i.e., online formats, shorter time frames, etc.) may impact the trajectory from state to trait mindfulness.

Mindfulness Program

As mindfulness has become more popular in the treatment of psychopathology, there have been more mindfulness programs created. Crane et al. (2017) noted there are "ingredients" of mindfulness-based programs (MBP) that are the essential elements. They are as follows:

1. Informed by theory.

2. Underpinned by a model of human experience which addresses the cause of human distress and the pathways relieving it.

3. Develops a new relationship with experience characterized by present moment focus, decentering, and an approach orientation.

4. Supports the development of greater attentional, emotional, and behavioral self-regulation, as well as positive qualities such as compassion, wisdom, equanimity.

5. Engages the participant in sustained intensive training in mindfulness meditation practice (p. 993).

In addition to these ingredients for creating a program, Stein and Witkiewitz (2020) dismantled popular MBP such as MBSR and Mindfulness-based Cognitive Therapy to determine the pertinent ingredients. They found acceptance skills, present moment monitoring, and

reappraisal (i.e., shifting to an accepting stance when faced with a difficult experience) were the most consistent within successful programs.

Mindfulness-Based Stress Reduction Program (MBSR). As noted previously, MBSR was the original MBP that emerged in 1979 and can be credited for the growth in popularity of mindfulness. Santorelli et al. (2017) detailed the authorized curriculum for MBSR and describe it as an eight-week course where participants meet for two and a half hour classes weekly. Additionally, participants complete a day of mindfulness which is comprised of a 7.5-hour class and is typically held during the sixth or seventh week. Each week participants are taught informal and formal mindfulness practices. Informal mindfulness practice occurs when participants bring increased awareness of tasks throughout their day while formal mindfulness practice is an intentional commitment to practice mindfulness for a predetermined time (Pace, 2016). Table 1 documents the eight-week breakdown of MBSR.

Table 1.1

MBSR Curriculum

Week	Theme	Formal Practice	Informal Practice
1	Awareness and the breath	Body scan and standing yoga	Eating meditation
2	Perception and creative responding to the environment	Sitting meditation and body scan	Mindfulness of routine activities
3	Pleasure and power in being present	Mindful lying down yoga	Mindful listening and speaking
4	Conditioning and perception shape our experience	Standing yoga and sitting meditation	Mindful listening and speaking
5	Awareness of being stuck	Standing yoga and sitting meditation	Mindful listening and speaking
6	Expressing feelings accurately and becoming more aware of emotions	Standing yoga and sitting meditation	Mindful listening and speaking
All day class	Practice being present and being open to any experience	Yoga, sitting meditation, body scan, walking	Eating meditation at lunch

		meditation, loving kindness meditation, visual meditation	
7	Integrating mindfulness within one's life	Loving-kindness meditation	Mindful listening and speaking
8	Remaining disciplined in practice	Body scan, yoga, and sitting meditation	Mindful listening and speaking

Note. Adapted from Santorelli et al.'s (2017) curriculum.

MBSR is one of the most researched MBP because it was the first created, and in its traditional eight-week form, research has demonstrated its effectiveness on multifarious presenting concerns such as depression, stress/anxiety, and chronic pain (Li & Bressington, 2019; Pardos-Gascón et al., 2021; Song & Lindquist, 2015). However, an eight-week course is not always feasible for individuals experiencing psychopathology. Moreover, attending MBSR in person may not be an option. Thus, there is a need to explore the trajectory of state and trait mindfulness when the adapted version is shorter and online.

McCrown et al. (2010) stated the structure of MBSR has been widely accepted as a curriculum and the program's curriculum can be modified for specific populations and course lengths. Traditional MBSR is an eight-week, intensive, in-person training, consisting of 26 hours of training. However, this structure does not translate well into talk therapy and the standard duration is not feasible for everyone's schedule. There is a need to understand how MBSR can be modified because the traditional format is not accessible to everyone such as those living in rural areas without access to an instructor. Thus, research has explored modifications of MBSR and found success.

8-weeks vs. Briefer Courses. McCrown et al. (2010) cited multiple studies (e.g., Jain et al., 2003; Rosenzweig et al., 2003; Speca et al., 2000) who have successfully modified MBSR to different durations and class lengths and noted the changes altered the time for discussion and didactic material but retained the core psychoeducation and presented practice. Moreover,

Carmody and Baer (2008) found a non-significant difference in the mean effect sizes between 30 studies that ranged in the number of MBSR sessions (i.e., four sessions to ten sessions) providing more evidence that MBSR can be shortened without comprising potential benefits.

    Online vs. In-person MBP Formats. When MBP rose in popularity, they were originally provided through in-person instructional formats. However, in the wake of COVID-19, there was a push for online interventions, which has remained a preference as COVID-19 cases have declined because online formats increase accessibility amongst populations who may not otherwise have had access to MBPs. As online MBP has risen in popularity, several researchers have studied the differences between online and in-person formats of MBSR and found minimal differences in outcomes. For example, Sard-Peck et al. (2017) conducted research on the difference in psychological distress (i.e., anxiety and depressive symptoms) within a Spanish population using the eight-week version of MBSR. They found non-significant differences in psychological distress between the online and in-person version of the intervention; however, they found attendance adherence and satisfaction were higher in the in-person course suggesting the need for slight adaptations for the online version. Additionally, pedagogy research supports online instruction as Nguyen (2015) stated online learning is at least as effective as in person instruction.

    As online instruction has become increasingly popular, researchers have implemented online MBP and found positive results in their effectiveness. Broadly, Spikerman et al.'s (2016) found a small to moderate effect size with online-based MBP. Their meta-analysis included 15 Randomized Controlled Trials comparing online MBP to control conditions and most studies found that online MBPs reduce mental health symptoms more than the control (e.g., waitlist, psychoeducation, online discussion forum, etc.). More recently, Sanilevici et al. (2021)

conducted a study on whether an online MBSR would increase mental wellbeing and emotional

regulation in a sample of community members in Israel. They found that participants who

complete the online MBSR program had significantly reduced anxiety and stress, and

significantly increased their mindfulness skill and emotional regulation. These results are

consistent with research using in person MBSR programs, providing further evidence of online

MBSR's effectiveness.

  Synchronous vs Asynchronous Courses. Online MBPs have increased the accessibility

of individuals receiving mindfulness training, but scheduled meeting times can still hinder

participation if people have other obligations during the set meeting times. Thus, newer research

has explored the effectiveness of asynchronous, self-paced online MBP. For example, Cavanagh

et al. (2013) completed research looking at the effectiveness of a two-week self-paced online

MBP using 104 college students. They found the program reduced stress, anxiety, and depression

symptoms in their sample. Additionally, Kubo et al. (2021) conducted similar research using a

six-week self-paced online MBP on women with depression symptoms. The results showed

significant improvements in depression symptoms, stress, sleep disturbances, and mindfulness

skills. Finally, Ju et al. (2022) also explored the effectiveness of a self-paced four-week online

MBP using a community sample in China. They also found a significant reduction in depression,

emotional distress, stress, and anxiety symptoms in their sample. Taken together, while these

researchers implemented different self-paced online MBPs, their programs were successful at

reducing symptomology. Thus, there is evidence to support the use of an asynchronous, self-

paced online MBP for the proposed study.

  Challenges with MBSR Modifications. Despite the promising results on research

conducted using asynchronous, self-paced online MBPs, other researchers have found challenges

with its implementation. There is little agreement on the "ideal" format for condensing MBSR and making it into a self-paced course, but prior research (i.e., Cavanaugh et al., 2013; Ju et al., 2022; Kubo et al., 2021; Osin & Turilina, 2021, etc.) has found success with varying formats suggesting there are common ingredients in mindfulness teaching that can help make state mindfulness accessible. For example, Hölzel et al. (2011) recommended MBP start with attention-related meditations before moving onto other types because the skill of attention is needed before other skills of mindfulness can be developed. Moreover, Stein and Witkiewitz (2020) stated the necessary ingredients for successful MBPs are acceptance skills, present moment monitoring, and reappraisal (i.e., shifting to an accepting stance when faced with a difficult experience), but they did not state the order of presentation for these ingredients.

Prior research has highlighted the challenges of online MBSR programs to help streamline the modification process. For example, Osin and Turilina (2021) completed research on the effectiveness of a three-week MBP using experienced and novice practitioners. Using multilevel modeling, they found that individuals who are intrinsically more autonomous excel at a self-paced MBP more than those who are not. However, they found both groups experienced gradual increases in interest level and effort with the mindfulness-based interventions presented. Mrazek et al. (2019) noted online MBPs are the future but noted challenges with delivering MBPs online, such as tailoring the program to the audience. Other common challenges are maintaining engagement to prevent dropout and navigating obstacles and frustrations that commonly occur when beginning with mindfulness practice. To combat these identified challenges, Mrazek et al. (2019) encourages online MBP to be tailored toward their audience, chunked into small segments, and involving interactive exercises to increase engagement and

effective learning. Moreover, they recommend providing access to help should individuals experience challenges with accessibility or increased distress.

Despite these challenges, online and asynchronous MBPs may be particularly well-suited to reaching rural populations. Rural communities face various barriers to mental health treatment due to financial strain, lack of resources, poor internet connection, transportation issues, and a cultural norm of distrust in providers (Keller & Owens, 2020; Tristiana et al., 2018). Scarce research has studied mindfulness applications in rural communities. Instead, researchers have recruited individuals from rural areas to take part in in-person mindfulness effectiveness research (e.g., Murray-Swank et al., 2020; Samios, 2018). Due to limited resources in rural areas (e.g., limited transportation, unreliable broadband access, barriers in mental health, etc.) there is a need to test the effectiveness and receptibility of online and asynchronous mindfulness programs because these programs are more sustainable long-term compared to in-person programs (Boerngen & Rickard, 2021; de la Varre et al., 2011). Thus, the present study aims to collect data from a rural location using an online asynchronous program to further understand how mindfulness research relates to rural communities.

Present Study Aims

Given the promising research with online, asynchronous, and briefer MBSR protocols, the current study sought to implement a four-week online asynchronous MBSR protocol. While research has found that these three components produce positive outcomes in mindfulness, research has yet to produce a validated online, asynchronous, and abbreviated MBSR protocol. Thus, the research aimed to borrow course components from previously researched abbreviated MBSR protocols; upon completion of the research, we plan to house the full course on an open-access platform (i.e., OSF) to help encourage continuity in future abbreviated MBSR research.

The present study looked at how psychopathology (i.e., anxiety, depression, trauma, and alcohol use) predicted the trajectory of state to trait mindfulness through this online, asynchronous, four-week MBSR. Based on the state of the current literature, the following hypotheses were tested:

1. Increased development of state mindfulness will predict the trajectory to trait mindfulness.

2. Psychopathology (i.e., anxiety, depression, trauma, and alcohol use) will predict lower levels of state mindfulness at baseline.

3. Psychopathology will negatively predict the development of state and trait mindfulness, such that participants with higher levels of psychopathology will have slower growth from state to trait mindfulness.

CHAPTER 2

METHODS

Participants

Using voluntary response sampling, we recruited 274 participants from a southeastern university and local, general population across 12 months. Kline (2011) recommends a minimum sample size of 200 when testing structural equation models due to their complexity. Initially, we limited recruitment to a southeastern university; however, six months into data collection, there was a concern that there would not be enough data to ensure minimum power was met, as participant attrition presented as an issue. Thus, the study was opened to the local, general population. To participate, participants had to be over the age of 18. Participants were excluded if they were under the age of 18, if they did not engage in any of the course materials, or if they failed more than one attention check during the first survey. We chose to use the first survey's attention checks as a primary method of exclusion because we found the general trend of people who passed the first survey's attention checks often passed later attention checks and engaged more in the course. Additionally, having more liberal exclusionary criteria allowed us to maintain 202 participants, which met Kline's (2011) recommended sample size. Thus, when the data were cleaned, there were 202 participants in the entire database; 175 completed the baseline scales, 118 completed week one scales, 107 completed week two scales, 95 completed week three scales, and 105 completed week four scales[1].

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[1] A higher number of participants in week four may be explained by some participants skipping week three's survey or clicking through week three's course materials without engagement.

Materials

Basic demographic data such as age, gender, race, highest level of education, religion,

area of upbringing (i.e., rural, urban, or suburban) and year in school were collected to describe

the sample used in the research (see Table 2.1).

Table 2.1

Demographics Descriptive Statistics

Variable	*N*	%
Gender	179	88.6%
Man	32	15.8%
Non-Binary	3	1.5%
Woman	142	70.3%
Prefer not to say	2	1%
Current Student	83	41.1%
Yes	47	23.3%
No	36	17.8%
Highest Level of Education	179	88.6%
Attended high school	2	1.0%
Completed high school or high school equivalency	15	7.4%
Attended college	88	43.6%
Completed a two-year college degree	23	11.4%
Completed a four-year college degree	20	9.9%
Attended graduate or professional school	31	15.3%
Population of Current Home	179	88.6%
Less than 2,500	12	5.9%
Between 2,500 – 9,999	32	15.8%
Between 10,000 – 49,999	86	42.6%
50,000 or more	49	24.3%
Religious Affiliation	178	88.1%
Agnostic	19	9.4%
Atheist	5	2.5%
Buddhist	2	1.0%
Christian	110	54.5%
Hindu	4	2.0%
Jewish	3	1.5%
Unitarian Universalist	1	0.5%
Nothing in Particular	30	14.9%

Catholic	2	1.0%
Race/Ethnicity	194	96%
American Indian or Alaskan Native	3	1.5%
Asian or Pacific Islander	7	3.5%
Black or African American	46	22.8%
Hispanic or Latino	17	8.4%
Middle Eastern or North African	2	1.0%
Multi-racial or multi-ethnic	5	2.5%
White or European American	114	56.4%
	N	*M*(*SD*)
Age	162	26.81(10.41)

The reliabilities of all scales described below can be found in Table 2.2. See Figure 2.1

for details on when each scale was administered across the study.

Table 2.2

Reliability Coefficients Across Scales

Scale	Cronbach's Alpha	Omega
Baseline		
State Mindfulness Scale	.95	.95
Trait Mindfulness (FFMQ)	.76	.71
Patient Health Questionnaire (PHQ-9)	.86	.87
Beck's Anxiety Inventory	.92	.92
PTSD Checklist for DSM-5	.95	.95
Alcohol Use Disorder Identification Test	.84	.86
Week 1		
State Mindfulness Scale	.94	.94
Trait Mindfulness (FFMQ)	.80	.76
Week 2		
State Mindfulness Scale	.95	.95
Trait Mindfulness (FFMQ)	.73	
Week 3		
State Mindfulness Scale	.96	.95
Trait Mindfulness (FFMQ)	.78	.72
Week 4		
State Mindfulness Scale	.94	.94
Trait Mindfulness (FFMQ)	.84	.81

Patient Health Questionnaire (PHQ-9)	.86	.87
Beck's Anxiety Inventory	.92	.92
PTSD Checklist for DSM-5	.96	.97
Alcohol Use Disorder Identification Test	.83	.82

Mindfulness Measures

State Mindfulness. State mindfulness was measured using the 21-item State Mindfulness Scale (SMS; Tanay & Bernstein, 2013). Participants were presented with an item, such as "I noticed pleasant and unpleasant emotions," and responded on a five-point Likert scale (1 = "Not at all," 5 = "Very well). Multiple samples have been used to explore the scale's validity (e.g., general adult community, meditation-naïve participants, and participants who have engaged in an MBI) and reliability has ranged from α = .92 to .95 (Tanay & Bernstein, 2013). The SMS has demonstrated convergent validity with the Toronto Mindfulness Scale (r = .31-.43) and the observing subscale of the Five Facet of Mindfulness Questionnaire (r = .39-.47; Tanay & Bernstein, 2013). Additionally, test-retest reliability has been established using one-week intervals (r = .65; Tanay & Bernstein, 2013).

Trait Mindfulness. The Five Facets of Mindfulness Questionnaire-15 (FFMQ-15; Baer et al., 2008) is a 15-item abbreviated version of the Five Facets of Mindfulness Questionnaire (Baer et al., 2006) and was used to measure trait mindfulness' five dimensions: acting with awareness, describing, nonjudgement, observing, and nonreacting. Gu et al. (2016) found the dimensions of the FFMQ-15 are strongly correlated to the FFMQ, demonstrating that they both measure similar constructs. Moreover, the FFMQ-15 has demonstrated reliability with Cronbach's alphas ranging from .64-.76 across the subscales within a sample of adults with depression (Gu et al., 2016), and internal consistency for the FFMQ-15 ranged from .64-.80 across the five dimensions (Gu et al., 2016).

Mindfulness Experience and Engagement. The participants' experience and engagement with the MBI presented each week was measured through four items developed by Osin and Turilina (2021). The participants were asked to evaluate whether each statement reflected their experience of that day's mindfulness exercise. The questionnaire included the following items: "While engaging in mindfulness today, I felt that I was applying my efforts," "The mindfulness was valuable and meaningful for me," "I was enjoying the process of the mindfulness," and "I felt that nothing was happening and was experiencing boredom." The participants responded to the items using a 7-point Likert-scale (1 = "Completely Disagree," 7 = "Completely Agree"). These items were derived from Osin and Leontiev's (2017) validated Experiences in Activity Questionnaire; Osin and Turilina (2021) adapted seven items from the original measure with the highest factor loading ($\lambda > .70$). The present study used the four most related to the purposes of data collection (i.e., understanding their experience with the mindfulness intervention). A summary of these data is found in Table 2.3, and in sum the data shows that participants generally engaged in mindfulness practice during the course.

Table 2.3

Summary of Mindfulness Engagement Data

Engagement Question	*M(SD)*
Week 1	
While Engagement in Mindfulness Today, I felt that I was applying my efforts.	2.15(.863)
The mindfulness was valuable and meaningful to me.	2.08(.822)
I was enjoying the process of the mindfulness.	2.13(1.05)
I felt that nothing was happening and was experiencing boredom.	4.19(1.13)
How many times did you practice mindfulness in the past week?*	4.33(4.45)
How many minutes, on average, did you practice mindfulness this week?*	31.25(33.58)
Week 2	
While Engagement in Mindfulness Today, I felt that I was applying my efforts.	1.99(.92)
The mindfulness was valuable and meaningful to me.	1.99(.82)
I was enjoying the process of the mindfulness.	1.99(.87)
I felt that nothing was happening and was experiencing boredom.	4.06(1.33)
How many times did you practice mindfulness in the past week? *	4.20(3.99)

How many minutes, on average, did you practice mindfulness this week? *	28.70(35.46)
Week 3	
While Engagement in Mindfulness Today, I felt that I was applying my efforts.	2.04(.97)
The mindfulness was valuable and meaningful to me.	1.94(.99)
I was enjoying the process of the mindfulness.	2.08(1.05)
I felt that nothing was happening and was experiencing boredom.	4.44(1.30)
How many times did you practice mindfulness in the past week? *	4.42(4.81)
How many minutes, on average, did you practice mindfulness this week? *	31.20(31.09)
Week 4	
While Engagement in Mindfulness Today, I felt that I was applying my efforts.	1.79(.79)
The mindfulness was valuable and meaningful to me.	1.70(.73)
I was enjoying the process of the mindfulness.	1.75(.88)
I felt that nothing was happening and was experiencing boredom.	4.65(1.10)
How many times did you practice mindfulness in the past week? *	5.77(8.63)
How many minutes, on average, did you practice mindfulness this week? *	37.68(39.49)

Note. Scaled 1-6; 1 = Strongly Agree; 2 = Somewhat Agree; 3 = Agree; 4 = Somewhat Disagree;

5 = Disagree; 6 = Strongly Disagree; * different scale used for measurement.

Mindfulness Practice History. Participants were asked a series of questions about their previous mindfulness experience and practice habits to categorize them into novice or experienced practitioner groups. Thus, participants were asked the following questions: (1) Do you practice mindfulness or what you consider a "mindfulness practice"? (2) How long have you been practicing mindfulness? (3) How often do you meditate now? (4) At what age did you first begin practicing mindfulness? and (5) Please briefly describe your current mindfulness practice in terms of: Does your practice have a name? When and how often do you engage in the mindfulness practice? What do you do when you are practicing mindfulness? What drives you to practice mindfulness? The details of these descriptors are found in Table 2.4.

Table 2.4

Mindfulness Practice History of Participants

Mindfulness Experience Question	N
Do you currently regularly practice mindfulness?	
Yes	58
No	127
How long have you been practicing mindfulness?	

Less than one month	8
1-6 months	12
6 months – 1 year	11
1-2 years	11
2-5 years	11
+5 years	4
How often do you practice mindfulness now?	
More than twice a day	10
Twice a day	6
Once a day	10
A couple times per week	24
Once a week	5
	M(*SD*)
At what age did you first begin practicing mindfulness?	21.70(8.06)

Psychopathology Measures

Depression. Participants were administered the nine-item Patient Health Questionnaire (PHQ-9; Kroenke et al., 2001) to measure depression-related symptoms from the last two weeks. The PHQ-9 includes items such as "Little interest or pleasure in doing things," and "Feeling down, depressed, or hopeless" and participants respond using a 4-point Likert scale (0 = "Not at all," 3 = "Nearly every day"). The scale has demonstrated excellent reliability for one-week test-retest ($r = .98$; Woldetensay et al., 2018). Moreover, the PHQ-9 is validated for use with college students ($\alpha = .89$; Keum et al., 2018).

Anxiety. Participants' experiences of anxiety were measured using the 21-item Beck's Anxiety Inventory (BAI; Beck et al., 1988). Participants responded to symptom-related items such as "difficulty concentrating," or "tight, tense muscle," using a 4-point Likert-scale (0 = "Not at all," 3 = "A lot"). Moreover, the participants were responding based on anxiety symptoms experienced in the past month. The BAI has demonstrated convergent validity with the State Trait Inventory and Hamilton Rating Scale for Anxiety ranging from $r = .47$ to $.81$ (Beck et al., 1988). Moreover, the observed Cronbach's alpha was .89 and the one-week test-

retest reliability coefficient was $r = .75$ in a college sample and a caregiving sample, respectively (Ayala et al., 2005; Toledano-Toledano et al., 2020).

Trauma. Trauma levels were measured using the 20-item PTSD Checklist for DSM-5 (PCL-5; Weathers et al., 2013). Participants reported how much they were bothered by symptoms in the past month using a five-point Likert-scale (0 = "Not at all," 4 = "Extremely). An example item is, "repeated, disturbing, and unwanted memories of the stressful experience?" The PCL-5's psychometric properties within a community sample are excellent with high internal consistency ($\alpha = .94$) and convergent validity with other PTSD measures (e.g., $r = .85$, .85, and .84; Blevins et al., 2015).

Alcohol Use. Alcohol use was measured using the Alcohol Use Disorders Identification Test (AUDIT; Saunders et al., 1993). The AUDIT contains ten items, and an example item is "How many drinks containing alcohol do you have on a typical day when you are drinking?" Participants answered each item on a scale that ranges from 0 ("Never") to 4 ("4 or more a week," "Daily or almost daily," "10 or more," or "Yes, during the last year," depending on the item). The participants are asked to complete the AUDIT based on their drinking habit in the last year. The AUDIT is reliable ($\alpha = .81$) and valid for use with college students (Kokotailo et al., 2004). Moreover, the AUDIT has good one-week test-retest reliability in a general population ($r = .84$; Selin, 2003).

Mindfulness Course

The present study used a self-paced, online, four-week mindfulness course adapted from Palouse Mindfulness' (n.d) course materials (see Table 2.5). Palouse Mindfulness (n.d.) is a free self-paced and online eight-week version of MBSR and has been used frequently in mindfulness research (e.g., Green et al., 2019; Isham et al., 2022; Terry et al., 202). However, due to limited

resources and feasibility, the proposed study abbreviated the MBSR protocol; thus, to balance

feasibility and maintain the integrity of the MBSR protocol, it was chosen to reduce the length to

four weeks.

Table 2.5

Description of Mindfulness Course

Week	Theme	Intervention	Goal
1	Building Awareness	Body scan	Bringing awareness to everyday life
2	Cultivating attention	Sitting meditation	Begin to pay more attention to the breath
3	Dealing with difficult emotions and stress	Physical practice (i.e., yoga and walking meditation)	Begin to pay more attention to bodily sensations
4	Dealing with Difficult Thoughts and Building Compassion	Loving-Kindness Practice	Notice experiences without judgment

To help guide the reduction process, the researcher relied on previous researchers who

used four-week MBSR protocol outlines (i.e., Demarzo et al., 2017; Smith et al., 2015; see Table

2.6). Additionally, the proposed MBSR protocol incorporated primary elements of MBSR

identified by de Vibe et al. (2010) including: (a) body-scan exercise, (b) attention to breath, (c)

physical exercise focused on increasing awareness of bodily sensations, and (d) practicing

awareness in everyday life.

Table 2.6

MBSR Protocols from Previous Research

Week #	Demarzo et al. (2017) Protocol	Smith et al. (2015) Protocol
1	What is mindfulness? Increasing awareness.	Focusing on mindfulness breathing and bodily sensations
2	Focus on attention and the breath	Mindfulness of feeling

| 3 | Body scan | Mindfulness of mind |
| 4 | Walking meditation and incorporating mindfulness in daily life | Awareness of one's unique experiences |

Each week, participants logged onto the online platform and participated in the MBP; course materials for the week's module were set up to automatically release when participants interacted with all the materials from the previous week's module. The participants were instructed to only complete one module per week. Each week, participants were given instructional materials to help build on their knowledge about mindfulness as they were led through the intervention. Participants were encouraged to practice the mindfulness interventions in between their course sessions and asked to report their practice habits.

Prior to data collection, 10 undergraduate students piloted the online self-paced course to ensure it was operational; their data was not included in the final analysis. Multiple safeguards were put in place to ensure participants were engaging in the MBI, such as attention checks embedded into the surveys that the participants completed at the end of each week. For example, participants were asked, "Did you take the exercise seriously?" Additionally, the online platform allows instructors to see how long participants interacted with each piece of content. Unfortunately, after six months of data collection, it was revealed that over 50% of participants were clicking through the material within less than 10 minutes and failing to complete the surveys at the end of each module. To combat this, the researcher embedded a quiz into each module that contained three randomized questions from a set of eight questions, and participants needed to correctly answer two of the three questions to unlock the mindfulness exercises and move onto the next module. Participants had an unlimited number of attempts to pass the quiz and the questions were derived from the videos and readings presented in each module.

Data were collected on participants' engagement in each of the course activities, as the online learning platform used to host the mindfulness course automatically captured these data. Table 2.7 includes the descriptive statistics for the course engagement along with information on how long the course and its sections were expected to take. Notably, the engagement data captured through the online learning platform created a separate, deidentified database from the database used in the main analyses, as the variables for the primary analyses were measured using an external survey (i.e., Qualtrics). There was no way to link these two databases to track individual participants' engagement with the course and development of outcomes variables.

Using the engagement database, an independent sample t-test was completed to determine if there were significant differences in engagement between current students and community members; we did not find a significant difference $t(272) = .498$, $p > .05$. Additionally, we did find a significant difference in course engagement between those who engaged in more than ten minutes on the course ($M = 110.88$; $SD = 108.62$) and those who engaged in ten minutes or less of the course ($M = 62.36$; $SD = 97.33$), $t(151.28) = -12.36$, $p < .05$.

Table 2.7

Means and Standard Deviations of Course Engagement

Variable	Full Sample Total Time (in mins) M(SD)	Participants Who Spent 10+ Minutes (in mins) M(SD)	Length of Course Content (in mins)
Total Course Visits	27.43(24.80)	40.78(22.29)	
Total Time Spent on Course	62.36(97.33)	110.88(108.62)	175
Week 1			
Total Time Spent on Week 1	18.08(27.36)	32.50(29.90)	40
Visits to Week 1 Mindfulness Meditation Practices	1.83(1.14)	1.91(1.77)	
Minutes Spent on Week 1 Mindfulness Practices	2.42(6.80)	4.34(8.68)	20

Week 2			
Total Time Spent on Week 2	9.41(19.52)	16.91(23.70)	30
Visits to Week 2 Mindfulness Meditation Practice	1.34(.68)	1.61(1.75)	
Week 3			
Total Time Spent on Week 3	6.83(16.15)	12.46(20.26)	30
Visits to Week 3 Mindfulness Meditation Practice	1.04(1.56)	1.61(1.75)	
Minutes Spent on Week 3 Mindfulness Practices	3.16(8.82)	5.63(11.26)	30
Week 4			
Total Time Spent on Week 4	5.74(16.51)	10.44(21.17))	30
Visits to Week 4 Mindfulness Meditation Practice	1.08(1.55)	1.63(1.67)	
Minutes Spent on Week 4 Mindfulness Practices	2.77(7.14)	4.79(8.93)	25

Note. Full sample = 274; participants who spent more than 10 minutes on the course = 154.

Procedure

Prior to data collection, IRB approval (protocol H23168) was obtained for the proposed study. Qualtrics was used to host the battery of questionnaires; the survey and course were disseminated through an online learning platform, Desire2Learn. Recent research by Casler et al. (2013) has found indistinguishable differences in the results between in-person and online survey distribution methodologies and Krusche et al. (2013) found indistinguishable differences between in-person and online mindfulness course distribution; thus, the online delivery of the mindfulness course and survey was not expected to be a limitation.

To recruit participants from the university, the researcher emailed department chairs and deans across the university, asking for the dissemination of the research flyer (see Appendix A). To recruit participants from the community, the researcher reached out to local health-related practices and asked for them to hang the recruitment flyer in their offices. Additionally, the researcher posted information about the study on social media platforms (see Appendix B). Participants were told that there they could enter a random drawing for 20 $50 Amazon gift cards

in exchange for their participation; however, to comply with Georgia laws, no participation was necessary to be entered into the drawing. For both recruitment methods, participants were asked to email the researcher to be added into the course. Students who participated in the study could receive extra credit in their courses if their professors granted it; each student could not receive both extra credit and enter the random drawing – they were required to choose which compensation method they desired.

Participants were added to the course on Desire2Learn, an online learning platform hosted by the university. The primary investigator manually entered existing students into the course using their school email. Community members needed to have an account created before being added into the course, which was completed with the help of the university's teaching center. After all data were collected, all identifying information (i.e., name, email address, student ID) were removed from the final dataset and destroyed to make the data anonymous and protect participant confidentiality.

Upon entering the course, participants were presented with the informed consent (see Appendix C) and were informed they were welcome to stop participating in the course at any time without repercussions. Initially, when accessing the course, participants were introduced to mindfulness and given an overview of the course format. Then, they were asked to complete a battery of measures that served as the baseline data. Following the completion of the baseline measures, participants were automatically given access to week one (i.e., module 1). Participants were expected to interact with the readings and videos in each module; then, they were prompted to complete the three-question quiz (i.e., effort measure). Once they successfully passed the quiz, the mindfulness exercise(s) were unlocked. Immediately following the completion of the mindfulness intervention, they were prompted to complete the state mindfulness measure, trait

mindfulness measure, and the mindfulness experience and engagement items. The flow of data

collection remained the same for weeks one through four (see Figure 2.1); however,

demographic information, psychopathology measures, and mindfulness practice history were

collected again after the completion of the state mindfulness measure at week four. Following

the completion of the survey during week four, participants were presented with a debriefing

statement (see Appendix D) and a separate link to enter the random raffle or receive course credit

(depending on instructor approval). To reduce panel conditioning, each week the measures were

randomized at the measurement level and item level to prevent order effects.

Figure 2.1

Participant Flow
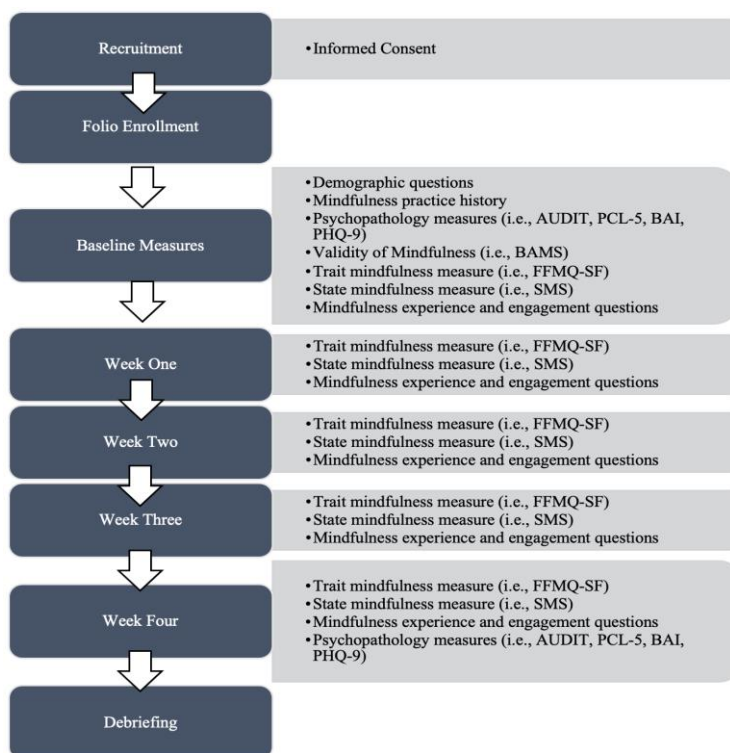
Statistical Analysis Plan

Cleaning Data/Missing Data

Initially, the researchers cleaned the data and omitted participants who incorrectly answered more than one attention check across the five surveys. Data were then screened for missing data patterns, skew, and kurtosis before the main analyses were conducted. Missing data patterns were assessed at the item level using Missing Values Analysis in SPSS v.19.0.1.1. Data were determined to be Missing Completely at Random (i.e., MCAR) and Full Information Maximum Likelihood (i.e., FIML) was used to manage missing data in the primary analyses.

Planned Analyses

After the data was cleaned, preliminary descriptive statistics were run to capture the characteristics of the participants and measures (e.g., means, standard deviations, reliabilities, demographic frequencies). Using structural equation modeling to examine a bivariate latent growth curve (see Figure 2.2), the present study explored the development of state mindfulness by examining how state mindfulness at baseline (intercept) predicts growth in state mindfulness over time (slope). Data were analyzed to explore how baseline levels of trait mindfulness (intercept) predicted the growth of trait mindfulness over time (slope). Further, we explored the trajectory from state mindfulness to trait mindfulness by examining how state mindfulness at baseline (intercept) and over time (slope) both predicted the development of trait mindfulness at baseline (intercept) and over time (slope). Finally, the researcher looked at how each psychopathology measure (i.e., anxiety, depression, trauma, and alcohol misuse) predicts the development (intercepts and slopes) of state to trait mindfulness across the four-week mindfulness-based intervention. Statistical analyses were conducted using the packages lavaan and sem in the statistical program R to fit a bivariate latent growth curve model. Factor loadings

for intercepts were set to 1 and factor loadings for slopes were centered at zero for the first time point (baseline = 0, week 1 = 1, week 2 = 2, etc.). Intercepts and slopes across state and trait mindfulness were allowed to covary. All manifest variables were centered at baseline. Model fit was assessed using standard estimates and accepted cutoff criteria (CFI and TLI > .90, RMSEA and SRMR < .08; Hu & Bentler, 1999).

Figure 2.2

Planned Bivariate Latent Growth Curve Model
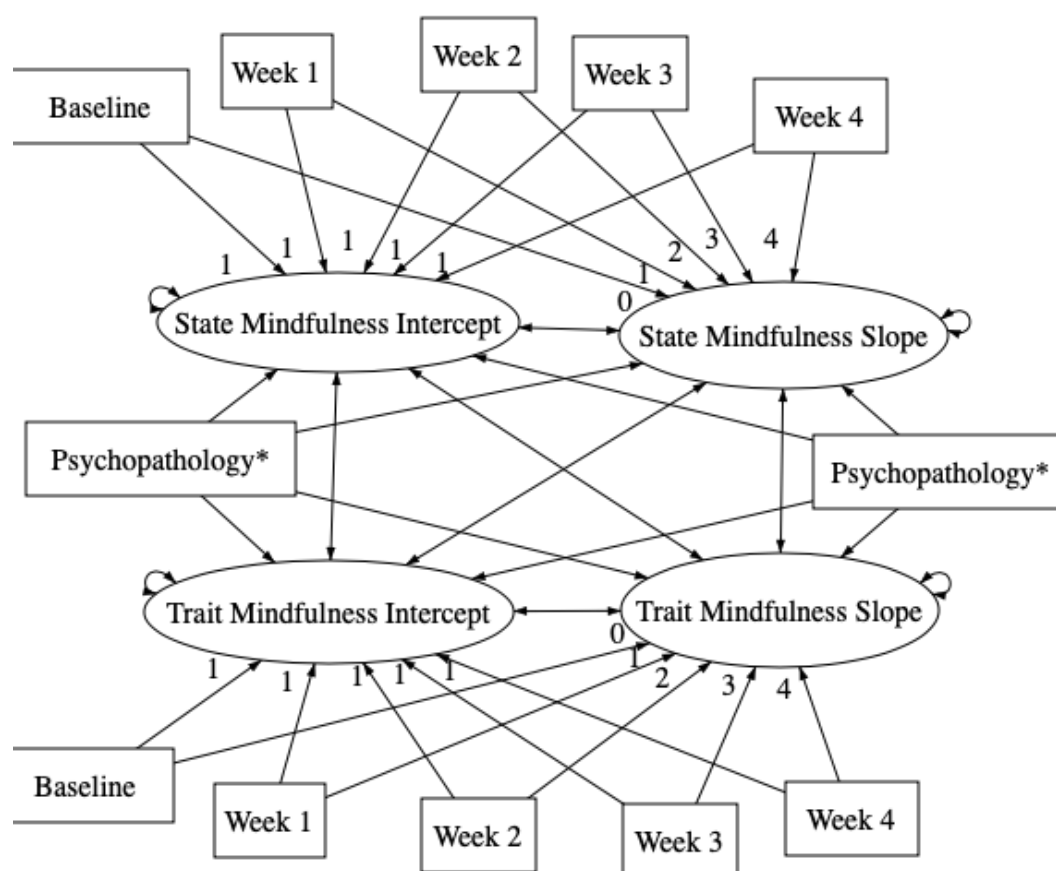
Note. *Psychopathology is comprised of anxiety, trauma, depression, and alcohol misuse as separate variables.

CHAPTER 3

RESULTS

Missing Data

Data were screened for missing data patterns, skew, and kurtosis before the main

analyses were conducted. Missing data patterns were assessed at the item level using Missing

Values Analysis in SPSS v.19.0.1.1 and had the following ranges: 8.4% - 15.8% (baseline),

36.6% - 42.6% (week 1), 43.6% - 47.5% (week 2), 49.5% - 53% (week 3), and 47.5% - 52%

(week 4). All subsequent analyses used full information maximum likelihood estimation in R

(Enders, 2013; Graham, 2009). According to Brown (2006) when using SEM, appropriate

skewness values are between -3 and +3, whereas acceptable kurtosis values are between -10 and

+10. All variables within the present study were within acceptable boundaries (see Table 3.1).

Preliminary Analyses

Prior to analyzing the latent growth curve models, a series of preliminary analyses were

completed to obtain the means, standard deviations, and intercorrelations between the variables.

Table 3.1 provides the means, skew, and kurtosis for the variables of interest and descriptively

shows a general increase in state and trait mindfulness over time, while a decrease in the

psychopathology measures between baseline and week four measures. The intercorrelations

between the variables of interest are presented in Table 3.2 and Table 3.3.

Table 3.1

Descriptive Statistics of Mindfulness and Psychopathology Measures Across Time

	M(SD)	Kurtosis	Skew
Baseline			
SM	65.93(18.28)	-0.67	-0.15
TM	44.27(7.4)	-0.18	0.26
Depression	18.51(5.79)	0.07	0.50
Anxiety	40.01(12.35)	-0.33	0.53

Alcohol	7.84(5.02)	3.88	1.80
Trauma	46.86(18.56)	-0.58	0.51
Week 1			
SM	77.08(15.31)	-0.79	-0.19
TM	44.27(7.42)	-0.18	0.26
Week 2			
SM	78.79(14.28)	-0.19	-0.49
TM	47.65(6.91)	1.09	0.57
Week 3			
SM	82.57(15.78)	-0.08	-0.61
TM	49.04(7.41)	0.53	0.67
Week 4			
SM	83.71(14.83)	-0.21	-0.66
TM	50.60(8.00)	0.65	0.60
Depression	15.27(5.24)	0.52	0.91
Anxiety	34.12(10.13)	0.27	1.01
Alcohol	4.98(4.64)	6.98	2.43
Trauma	37.95(17.04)	0.54	1.17

Note. Each cell is formatted as mean (SD); SM = State Mindfulness, range = 21 – 105, higher

values indicate higher state mindfulness; TM = Trait Mindfulness, range = 16 – 80; higher values

indicate higher trait mindfulness; Alcohol range = 0 - 46, higher values indicate greater alcohol

use); Depression range = 9 – 36, higher values indicate more severe depression levels; Anxiety

range = 22 – 88, higher values indicate more severe anxiety levels; Trauma range = 20 – 80,

higher values indicate more severe trauma levels.

Table 3.2

Correlation Matrix of Study Variables

Baseline	SM: BL/W1/W2/W3/W4	TM: BL/W1/W2/W3/W4	Anxiety: BL/W4	Trauma: BL/W4	Dep: BL/W4	Alc: BL/W4
SM	1/.269**/.280**/.228*/.317**	.290**/ .268**/.240*/.178/.103	.095/.019	-.015/.020	.009/.089	-.121/.190
TM	.290**/.073/.131/.030/-.041	1/.752**/.067/.546**/.389**	-.383**/-.280**	-.479**/-.243*	-.489**/-.150	-.204**/-.128
Anxiety	.095/.361**/.139/.090/.122	-.383/-.452**/.274**/-.369**/-.311**	1/.638**	.748**/.562**	.636**/.386**	.134/.191
Trauma	-.015/.147/.066/.206/.140	-.479**/-.478**/.084/-.382**/-.342**	.748**/.467**	1/.544**	.776**/.289**	.271**/.263*
Depression	.009/.179/.109/.222*/.158	-.489**/-.497**/.147/-.339**/-.328**	.636**/.489**	.776**/.504**	1/.386**	.146/.053
Alcohol	-.121/-.018/-.124/.014/-.005	-.204**/-.193/.017/-.103/-.174	.134/-.140	.271**/.117	.146/.142	1/.870**
Week 1						
SM	.269**/1/.686**/.467**/.610**	.073/.118/.365**/.243*/.293**	.261**/.068	.147/.065	.179/-.045	-.018/-.007
TM	.268**/.118/.232*/.222/.134	.752**/1/-.044/.708**/.651**	-.452**/-.308**	-.478**/-.277*	-.497**/-.322*	-.193/-.147
Week 2						
SM	.280**/.686**/1/.547**/.621**	.131/.232*/.176/.327**/.375**	.139/.041	.066/.007	.109/-.095	-.124/-.026
TM	.240*/.365**/.176/.109/.114	.067/-.044/1/-.124/-.152	.274**/.237*	.084/.227*	.147/.239*	.017/-.063
Week 3						
SM	.228*/.467**/.547**/1/.678**	.030/.222/.109/.336**/.310**	.090/.098	.206/.103	.222*/-.024	.014/.028
TM	.178/.243*/.327**/.336**/.329**	.546**/.708**/-.124/1/.805**	-.369**/-.454**	-.382**/-.479**	-.339**/-.434**	-.103/-.053
Week 4						
SM	.317**/.610**/.621**/.678**/1	-.041/.134/.114/.329**/.371**	.122/.058	.140/.062	.158/-.051	-.005/-.041
TM	.103/.293**/.375**/.310**/.371**	.389**/.651**/-.152/.805**/1	-.311**/-.437**	-.342**/-.495**	-.328**/-.502**	-.174/-.111
Anxiety	.019/.068/.041/.098/.058	-.280**/-.308**/.237*/-.454**/-.437**	.638**/1	.467**/.796**	.489**/.624**	.140/.112
Trauma	.020/.065/.007/.103/.062	-.243*/-.277*/.227*/-.479**/.-.495**	.562**/.796**	.544**/1	.504**/.696**	.117/.002
Depression	.089/-.045/-.095/-.024/-.051	-.150/-.322**/.239*/-.434**/-.502	.386**/.624**	.289**/.696**	.386**/1	.142/-.010
Alcohol	.190/-.007/-.026/.028/-.041	-.128/-.147/-.063/-.053/-.111	.191/.112	.263*/.002	.053/-.010	.870**/1

Note. * $p < .05$; ** $p < .001$; SM = State Mindfulness; TM = Trait Mindfulness; Dep = Depression; Alc = Alcohol; BL = Baseline; W1

= Week 1; W2 = Week 2; W3 = Week 3; W4 = Week 4.

Table 3.3

Correlation Matrix for the Trait Mindfulness Subscales

	Obs BL/W1/W2/W3/W4	Des BL/W1/W2/W3/W4	AWA BL/W1/W2/W3/W4	NJ BL/W1/W2/W3/W4	NR BL/W1/W2/W3/W4
BL					
Obs	1/.65*/.57*/.52*/.53*	.20*/.17/.29*/.11/.00	.13/.04/.05/-.05/-.05	-.07-.02/.05/-.05/-.07	.20/.19*/.29*/.15/.19
Des	.20*/.16*/.17/.10/.03	1/.68*/.28*/.46*/.29*	.18*/.10/-.16/.06/-.05	.12/-.03/.01/-.07/-.18	.26*/.03/.23*/.12/.14
AWA	.13/.12/.12/.07/.03	.18*/.22*/.08/.03/.12	1/.-.55*/-.56*/.53*/.46*	.26*/.30*/-.14/.26*/.12	.21*/.05/.11/.13/-.01
NJ	-.07/.03/-.08/.04/-.10	.12/.05/.05/.17/.21*	.26*/.44*/-.25*/.25*/.24*	1/.69*/-.61*/.66*/.50*	.30*/.28*/.27*/.27*/.18
NR	.21*/.27*/.15/.04/-.01	.26*/.16/.06/.02/.09	.21*/.33*/-.21*/.11/.12	.30*/.32*/-.26*/.25*/.18	1/.65*/.43*/.39*/.47*
Wk 1					
Obs	.65*/1/.69*/.59*/.56*	.15/.29*/.30*/.09/.13	.12/.09/-.03/.05/.08/	.03/.10/06/.01/.04	.27*/.26*/.26*/.26*/.28
Des	.16/.29*/.25*/.21/.16	.68*/1/.37*/.68*/.59*	.22*/.11/-.23*/.17/.16	.05/.09/-.15/-.01/.02	.16/.12/.18/.12/.06
AWA	.04/.09/-.05/-.11/-.06	.10/.11/.03/.15/.21	.55*/1/-.61*/.59*/.62*	.44*/.40*/-.36*/.35*/.31*	.33*/.12/-.05/.07/.00
NJ	-.02/.10/.03/.10/.02	-.03/.09/-.04/.14/.26*	.30*/.40*/-.28*/.36*/.28	.69*/1/-.69*/.82*/.66*	.32*/.30*/.32*/.35*/.19
NR	.19*/.26*/.22*/.11/.21*	.03/.12/.07/.07/.12	.05/.12/-.07/.07/.11	.28*/.30*/-26*/.24*/.18	.65*/1/.54*/.64*/.64*
Wk 2					
Obs	.57*/.69*/1/.76*/.58*	.17/.29*/.35*/.14/.13	.12/-.05/-.06/.12/.02	-.08/.03/-.00/.09/-.06	.15/.22*/.34*/.17/.18
Des	.29*/.30*/.35*/.29*/.15	.2*/.37*/1/.36*/.38*	.08/.03/.11/-.06/.04	.05/-.04/.27*/-.09/-.17	.06/.07/.27*/-.02/.01
AWA	.05/-.03/-.06/-.09/-.05	-.16/-.23*/.11/-.22*/-.29*	-.56*/-.61*/1/-.73*/-.61*	-.25*/-.28*/.44*/-.35*/-.31*	-.21*/-.07/.01/-.08/-.04
NJ	.05/-.06/-.01/-.10/-.15	.01/-.15/.27*/-.14/-.23*	-.14/-.36*/.44*/-.40*/-.31*	-.61*/-.69*/1/-.71*/-.66*	-.26*/-.26*/-.11/-.34*/-.19
NR	.29*/.26*/.34*/.33*/.23*	.30*/.18/.27*/.23*/.15	.11/-.05/.01/.04/.05	.27*/.32*/-.11/.23*/.15	.23*/.54*/1/.64*/.65*
Wk 3					
Obs	.52*/.59*/.76*/1/.76*	.10/.21/.29*/.20*/.14	.07/-.11/-.09/.06/.11	.04/.10/-.10/.11/.13	.04/.11/.33*/.23*/.22*
Des	.11/.09/.14/.20*/.16	.46*/.68*/.36*/1/.65*	.03/.15/-.22*/.16/.19	.17/.14/-.14/.04/.09	.02/.07/.23*/.21*/.13
AWA	-.05/.05/.12/.06/-.02	.06/.17/-.06/.16/.23*	.54*/.59*/-.73*/1/.80*	.25*/.36*/-.40*/.43*/.44*	.11/.07/.03/.07/-.101
NJ	-.05/.01/.10/.11/.06	-.07/-.02/-.09/-.04/.19	.26*/.35*/-.35*/.43*/.39*	.66*/ .82*/-.71*/1/.75*	.25*/.24*/.23*/.13/.05
NR	.15/.26*/.17/.23*/.24*	.12/.12/-.02/.21*/.10	.125/.073/-.080/.070/.066	.27*/.35*/-.34*/.13/.16	.39*/.64*/.64*/1/.71*
Wk 4					
Obs	.53*/.56*/.58*/.76*/1	.03/.16/.15/.16/.14	.03/-.06/-.05/-.02/-.02	.10/.02/-.15/.06/.08	-.01/.21*/.23*/.24*/.35*
Des	.00/.13/.13/.14/.14	.29*/.59*/.38*/.65*/1	.12/.21/-.29*/.24*/.32*	.21*/.26*/-.23*/.19/.28	.09/.12/.15/.10/.09
AWA	-.05/.08/.02/.11/-.02	-.05/.16/.04/.19/.32*	.46*/.63*/-.61*/.80*/1	.24*/.28*/-.31*/.39*/.52*	.12/.12/.05/.07/.00`
NJ	-.07/.04/-.06/.24/.08	-.18/.02/-.17/.09/.28*	.12/.31*/-.31*/.44*/.52*	.50*/.66*/-.66*/.75*/1	.18/.18/.15/.16/.06
NR	.19/.28*/.18/.21*/.35*	.14/.06/.01/.13/.09	-.01/.00/-.04/-.10/.00	.18/.19/-.19/.05/.06	.47*/.64*/.65*/.71*/1

Note. Obs = Observing; Des = Describing; AWA = Acting with Awareness; NJ = Nonjudgment; NR = Nonreactivity; * $p < .05$; ** $p <$

.001

Bivariate Latent Growth Curve Model

To answer the current study's research questions, a bivariate latent growth curve model was examined using SEM. Initially the full proposed bivariate latent growth curve model was examined, adding baseline psychopathology (i.e., depression, anxiety, alcohol, and trauma), final psychopathology (i.e., depression, anxiety, alcohol, and trauma), and covariates (i.e., rurality and previous mindfulness experience) one at a time. However, given the issues with model fit, and following Newsom et al.'s (2022) guidelines for identifying sources of misfit, we broke up the model into separate pieces to understand why the model fit was poor (see Table 3.4). In this process, we examined state and trait mindfulness latent growth curve models separately, and then added baseline psychopathology, final psychopathology, and covariates one at a time.

None of the trait-mindfulness-only models demonstrated adequate model fit. In attempts to remediate the issue, we attempted to model the multidimensional nature of the trait mindfulness measure (i.e., create latent variables for each facet of trait mindfulness that loaded onto a higher order trait mindfulness latent variable) in attempt to resolve the poor model fit; however, these efforts did not improve model fit. We briefly describe initial findings from the original, proposed bivariate latent growth curve model before describing results from the final best-fitting model selected (i.e., Model 8A): a latent growth model of state mindfulness including psychopathology at baseline and final time points, trait mindfulness at baseline and final time points, and the covariates rurality and previous mindfulness practice.

Table 3.4

Multi-step Process for Developing the Best Fitting Model

Model	Steps	A. State Mindfulness CFI/TLI/RMSEA/SRMS	B. Trait Mindfulness CFI/TLI/RMSEA/SRMS	C. Bivariate Growth Curve CFI/TLI/RMSEA/SRMS
1	Intercept only	0/.294/.25/.295	.099/.47/.255/.321	

2	Unconditional Linear Growth	.541/0.672/.17/.15	.368/.549/.235/.282	.487/.529/.159/.188
3	Baseline Psychopathology	.846/.815/.111/.098	.719/.663/.168/.213	.703/.649/.128/.164
4	Baseline Trait Mindfulness	.86/.815/.107/.091	.733/.647/.157/.197	
5	Final Trait Mindfulness	.867/.826/.097/.089	.75/.672/.14/.183	
6	Final Psychopathology	.918/.875/.075/.093	.833/.749/.11/.176	DNC
7	Rurality	.927/.872/.073/.074	.778/.709/.107/.164	.778/.709/.107/.164
8	Previous Mindfulness Experience	.920/.861/.072/.073	DNC	DNC

Note. Steps refer to the additional predictor, outcome, or covariate variables added to each model,

including all variables from the previous steps. DNC = Did Not Converge; Model fit was assessed

using standard estimates and accepted cutoff criteria (CFI and TLI > .90, RMSEA and SRMR <

.08; Hu & Bentler, 1999). The final model selected was Model 8A.

Trajectories of Mindfulness

Initially, we started by testing state mindfulness and trait mindfulness models

independently to understand their individual growth of state and trait mindfulness across the five

time points. We did not find adequate fit statistics for the state mindfulness intercept-only model

(Model 1A; CFI = 0.00, TLI = 0.294, RMSEA = 0.250, SRMR = 0.295) or the state mindfulness

intercept and slope model (Model 2A; CFI = 0.541, TLI = 0.672, RMSEA = 0.17, SRMS =

0.15). However, an examination of the means descriptively revealed a positive growth of state

mindfulness over time (Baseline: $M = 65.93$, $SD = 18.28$; Week 1: $M = 77.08$, $SD = 15.31$; Week

2: $M = 78.79$, $SD = 14.28$; Week 3: $M = 82.57$, $SD = 15.78$; Week 4: $M = 83.71$, $SD = 14.83$; see

Table 3.1). Additionally, we did not find adequate fit statistics for the trait mindfulness intercept-

only model (Model 1B; CFI = 0.099, TLI = 0.470, RMSEA = 0.255, SRMS = 0.321) or the trait

mindfulness intercept and slope model (Model 2B; CFI = 0.368, TLI = 0.549, RMSEA = 0.235,

SRMS = 0.282). Examination of the means across time revealed that trait mindfulness

descriptively remained stable across baseline ($M = 44.27$; $SD = 7.40$) and week one ($M = 44.27$;

SD = 7.42) before starting to increase between week two (*M* = 47.65; *SD* = 6.91), week three (*M* = 49.04; *SD* = 7.41), and week four (*M* = 50.60; *SD* = 8.00). Thus, it appeared trait and state mindfulness grew in participants across the four-week mindfulness course; however, the results should be interpreted with caution due to the inadequate fit statistics.

State-to-Trait Mindfulness

It was hypothesized that as participants' state mindfulness developed over time it would predict the trajectory to trait mindfulness. The bivariate state and trait mindfulness growth curve model was constructed without any additional predictors or covariates; the model did not show adequate fit statistics (Model 2C; CFI = .487; TLI = .529; RMSEA = .159; SRMR = .188). However, examination of the beta values revealed (1) as the intercept for state mindfulness increased, the intercept for trait mindfulness increased ($\beta = 0.649; SE = 8.54, p < .001$), (2) as the slope for state mindfulness increased, the slope for trait mindfulness increased ($\beta = 2.68; SE = 1.04; p < .001$), (3) as the intercept for state mindfulness increased, the slopes of state mindfulness ($\beta = -0.47; SE = 8.05; p < .05$) and trait mindfulness ($\beta = -0.56; SE = 2.84; p > .05$) decreased, (4) as the intercept of trait mindfulness increased, the slope for trait mindfulness decreased ($\beta = -0.29; SE = 1.57; p > .05$), and (5) as the slope for state mindfulness increased, the intercept for trait mindfulness decreased ($\beta = -0.88; SE = 3.15; p < .001$). These results suggest a possible complex relation between state mindfulness and trait mindfulness over time. However, these results should be interpreted with caution given the poor model fit.

Psychopathology and Covariates as Predictors of Mindfulness

Given the inadequate fit for the bivariate latent growth curve models or trait-only latent growth curve models, we focused on the state-only latent growth curve models to better

understand the development of state mindfulness and how psychopathology and trait mindfulness at baseline and the final time point might predict this trajectory. We also included two covariates: rurality and previous mindfulness experience. It was hypothesized that (1) psychopathology would predict lower levels of state mindfulness at baseline (intercept) and (2) psychopathology would negatively predict the development of state mindfulness (slope) and trait mindfulness at week 4, such that participants with higher levels of psychopathology will have slower growth of state mindfulness and final time point trait mindfulness. The final model had adequate fit across three out of four fit statistics: χ^2 (135) = 1036.84, $p < .001$, CFI = 0.920, TLI = 0.861, RMSEA = 0.072, SRMR = 0.073. Table 3.5 provides details of the full model; however, the best fitting model had the following structure (only statistically significant pathways are depicted in Figure 3.1 for ease of reading): (1) the intercept and slope of state mindfulness were scaled and allowed to covary; (2) all psychopathology variables, trait mindfulness, and covariates at baseline were regressed on the intercept and slope of state mindfulness; (3) all psychopathology variables and trait mindfulness were allowed to covary within time point; (4) autocorrelations between constructs were allowed to covary (e.g., baseline depression with final time point depression); and (5) the intercept and slope of state mindfulness and all psychopathology variables at baseline were regressed on final time point psychopathology variables and trait mindfulness.

Figure 3.1

Final Model with Statistically Significant Beta Values
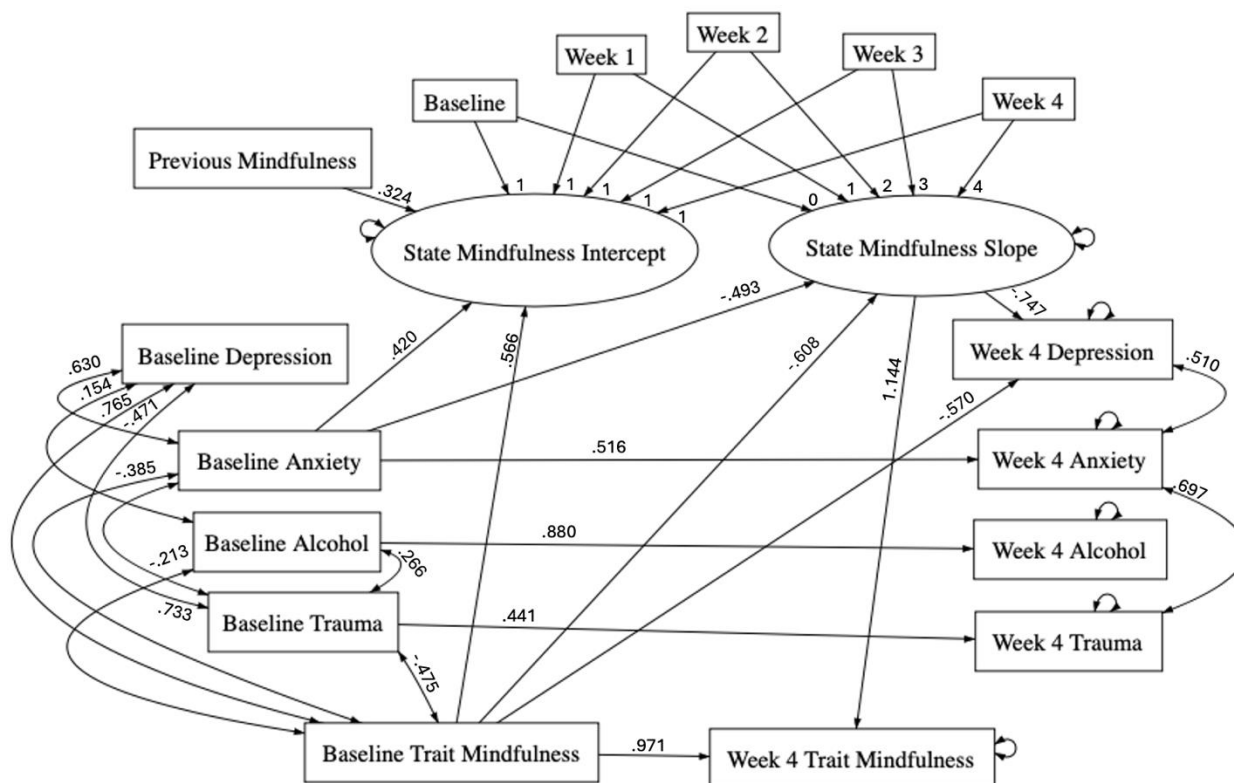
Table 3.5

Final Model Regression and Covariance Values

Regressions (Predictor → Criterion)	β	SE	p
BL Depression → SM Intercept	0.162	0.280	0.246
BL Anxiety → SM Intercept	0.420*	0.128	0.002
BL Alcohol → SM Intercept	-0.108	0.207	0.231
BL Trauma → SM Intercept	-0.107	0.096	0.490
BL TM → SM Intercept	0.566**	0.166	<0.001
Rurality → SM Intercept	-0.140	1.205	0.115
Previous Mindfulness Practice → SM Intercept	0.324**	2.301	<0.001
BL Depression → SM Slope	0.038	0.107	0.866
BL Anxiety → SM Slope	-0.493*	0.055	0.047
BL Alcohol → SM Slope	-0.008	0.069	0.950
BL Trauma → SM Slope	0.240	0.033	0.293
BL TM → SM Slope	-0.608**	0.069	0.001
Rurality → SM Slope	0.192	0.517	0.236

	β	SE	p
Previous Mindfulness Practice → SM Slope	-0.203	0.933	0.198
SM Intercept → Week 4 TM	0.151	0.181	0.570
SM Slope → Week 4 TM	1.144*	1.558	0.035
BL Depression → Week 4 TM	-0.098	0.281	0.636
BL Anxiety → Week 4 TM	0.368	0.164	0.153
BL Alcohol → Week 4 TM	0.004	0.189	0.971
BL Trauma → Week 4 TM	-0.293	0.091	0.174
BL TM → Week 4 TM	0.971*	0.464	0.028
Rurality → Week 4 TM	-0.265	1.769	0.169
Previous Mindfulness Practice → Week 4 TM	0.201	3.795	0.370
SM Intercept → Week 4 Depression	0.011	0.092	0.957
SM Slope → Week 4 Depression	-0.747*	0.698	0.041
BL Depression → Week 4 Depression	0.200	0.123	0.142
BL TM → Week 4 Depression	-0.570*	0.200	0.046
Rurality → Week 4 Depression	0.122	0.916	0.416
Previous Mindfulness Practice → Week 4 Depression	-0.023	1.947	0.895
SM Intercept → Week 4 Anxiety	0.015	0.137	0.924
SM Slope → Week 4 Anxiety	-0.226	0.988	0.385
BL Anxiety → Week 4 Anxiety	0.516**	0.105	<0.001
BL TM → Week 4 Anxiety	-0.247	0.324	0.291
Rurality → Week 4 Anxiety	0.064	1.317	0.555
Previous Mindfulness Practice → Week 4 Anxiety	-0.031	2.614	0.792
SM Intercept → Week 4 Alcohol	-0.001	0.031	0.995
SM Slope → Week 4 Alcohol	-0.144	0.218	0.290
BL Alcohol → Week 4 Alcohol	0.880**	0.053	<0.001
BL TM → Week 4 Alcohol	-0.059	0.059	0.558
Rurality → Week 4 Alcohol	-0.059	0.332	0.364
Previous Mindfulness Practice → Week 4 Alcohol	0.023	0.722	0.760
SM Intercept → Week 4 Trauma	0.117	0.246	0.488
SM Slope → Week 4 Trauma	-0.492	1.889	0.108
BL Trauma → Week 4 Trauma	0.441**	0.091	<0.001
BL TM → Week 4 Trauma	-0.407	0.547	0.093
Rurality → Week 4 Trauma	0.107	2.533	0.407
Previous Mindfulness Practice → Week 4 Trauma	-0.072	5.206	0.616
Covariances	β	SE	p
SM Intercept ~ SM Slope	-0.142	5.03	0.65
BL Depression ~ BL Anxiety	0.630**	6.257	<0.001
BL Depression ~ BL Alcohol	0.154*	2.251	0.048
BL Depression ~ BL Trauma	0.765**	10.15	<0.001
BL Depression ~ BL TM	-0.471	3.604	<0.001
BL Anxiety ~ BL Alcohol	0.136	4.864	0.087
BL Anxiety ~ BL Trauma	0.733**	21.164	<0.001
BL Anxiety ~ BL TM	-0.385**	7.407	<0.001
BL Alcohol ~ BL Trauma	0.266*	7.434	0.001
BL Alcohol ~ BL TM	-0.213*	3.079	0.010
BL Trauma ~ BL TM	-0.475**	11.550	<0.001

Week 4 Depression ~ Week 4 Anxiety	0.510*	6.521	0.023
Week 4 Depression ~ Week 4 Alcohol	-0.303	1.430	0.111
Week 4 Depression ~ Week 4 Trauma	0.542	1.930	0.054
Week 4 TM ~ Week 4 Depression	0.271	8.080	0.727
Week 4 Anxiety ~ Week 4 Alcohol	-0.105	1.976	0.409
Week 4 Anxiety ~ Week 4 Trauma	0.697**	18.457	<0.001
Week 4 TM ~ Week 4 Anxiety	-0.374	11.297	0.475
Week 4 Alcohol ~ Week 4 Trauma	-0.182	3.784	0.244
Week 4 TM ~ Week 4 Alcohol	-0.055	2.558	0.904
Week 4 TM ~ Week 4 Trauma	0.045	21.525	0.944

Note. BL = Baseline; SM = State Mindfulness; TM = Trait Mindfulness; * $p < .05$, ** $p < .001$

Baseline anxiety ($\beta = 0.420$, $p = 0.002$) and baseline trait mindfulness ($\beta = 0.566$, $p < .001$) predicted higher levels of initial (i.e., intercept) state mindfulness. In contrast, baseline anxiety ($\beta = -0.493$, $p = 0.047$) and baseline trait mindfulness ($\beta = -0.608$, $p = 0.001$) predicted a decline in state mindfulness trajectory (i.e., slope). In summary, individuals with higher baseline anxiety and baseline trait mindfulness tended to have higher initial levels of state mindfulness. However, both higher baseline anxiety and baseline trait mindfulness were also associated with a decline in state mindfulness over time. This implies that while individuals may start with elevated trait mindfulness levels, they may experience a steeper decline or deterioration in their state mindfulness levels over time.

Additionally, we found the growth (i.e., slope) of state mindfulness ($\beta = 1.144$ $p = 0.035$) and baseline trait mindfulness ($\beta = 0.971$, $p = 0.028$) positively predicted week four trait mindfulness. These findings suggest that as individuals' state mindfulness develops over time and those who initially have higher trait mindfulness are more likely to exhibit elevated trait mindfulness levels at the end of four weeks following mindfulness course participation.

Lastly, our model showcased predictions for psychopathology at the end of a four-week mindfulness course. Specifically, the growth (i.e., slope) of state mindfulness ($\beta = -0.747$, $p = 0.041$) and baseline trait mindfulness ($\beta = -0.570$, $p = 0.046$) negatively predicted week four

depression. Baseline anxiety ($\beta = 0.516$, $p < 0.001$) positively predicted week four anxiety, baseline alcohol use ($\beta = 0.880$, $p < 0.001$) positively predicted week four alcohol use, and baseline trauma ($\beta = 0.441$, $p < 0.001$) positively predicted week four trauma. In sum, these findings suggest initial trait mindfulness and the growth of state mindfulness over time may lead to reduced depression after a four-week mindfulness course. Additionally, higher levels of baseline anxiety, baseline alcohol, and baseline trauma are linked to higher levels of anxiety, alcohol use, and trauma following a four-week mindfulness course.

For covariate effects, previous mindfulness practice ($\beta = 0.324$, $p < 0.001$) statistically significantly predicted initial (i.e., intercept) state mindfulness. This finding suggests that individuals with a history of mindfulness practice started the course with higher levels of state mindfulness. Rurality did not statistically significantly predict state mindfulness intercept ($\beta = -0.140$, $p = .490$) or slope ($\beta = 0.192$, $p = 0.236$).

CHAPTER 4

DISCUSSION

Mindfulness is a popular intervention in the field of Clinical Psychology, as it is embedded into numerous theoretical orientations (e.g., Cognitive Behavioral Therapy, Acceptance and Commitment Therapy, etc.), and it is used as a standalone intervention. Previous research has found that higher levels of trait mindfulness protect against psychopathology (e.g., Chiesa & Serretti, 2013; Desrosiers et al., 2013; Sevilla-Llewellyn-Jones et al., 2018); however, the research on state mindfulness and psychopathology is mixed. These mixed findings suggest that some clients with higher levels of psychopathology may have greater difficulty engaging with mindfulness practice, thereby hampering their progression toward trait mindfulness and its associated benefits. The present study sought to explore how psychopathology (i.e., anxiety, trauma, alcohol use, and depression) relates to the growth of state and trait mindfulness. It was hypothesized that (1) increased development of state mindfulness would predict the trajectory to trait mindfulness, (2) psychopathology (i.e., anxiety, depression, trauma, and alcohol use) would predict lower levels of state mindfulness at baseline, and (3) psychopathology would negatively predict the development of state and trait mindfulness, such that participants with higher levels of psychopathology would have a slower growth from state to trait mindfulness. We found mixed support for the hypotheses.

Summary of Findings

Hypothesis #1: State Mindfulness Slope predicts the Slope of Trait Mindfulness

When testing models with both the slope and intercept of state mindfulness and the slope and intercept of trait mindfulness, we were unable to find a model with adequate fit statistics. Therefore, our hypothesis that the slope of state mindfulness would predict the slope of trait

mindfulness was not supported. However, in our final model, we found the slope of state mindfulness positively predicted week four trait mindfulness, suggesting that as state mindfulness developed over time for individuals, they had higher levels of trait mindfulness at the end of the mindfulness course. Although these findings are different than what was hypothesized, they still provide evidence that increases in state mindfulness over time may lead to higher levels of trait mindfulness. These findings support the findings from Kiken et al. (2015), who found that practicing mindfulness results in state mindfulness, and more access to state mindfulness leads to trait mindfulness.

In addition, we found those higher in baseline trait mindfulness had a steeper decline in state mindfulness overtime, which may suggest a more complex relationship between state and trait mindfulness trajectories such as floor and ceiling effects. For example, an individual who enters a mindfulness course with high trait mindfulness may score at the ceiling of the state mindfulness scale following practice, inhibiting them from growing in state mindfulness any further throughout the mindfulness course. Conversely, those lower in trait mindfulness at baseline had greater increases in state mindfulness over the course. Moreover, to further support this hypothesis, we found that higher baseline trait mindfulness predicted higher levels of baseline state mindfulness, and we found that baseline trait mindfulness predicted week four trait mindfulness; thus, it is possible trait mindfulness can continue to grow throughout the course, but there may be a ceiling on state mindfulness levels.

Hypothesis #2: Higher Psychopathology Predicts Lower Baseline State Mindfulness

Hypothesis two was not supported by our model, as trauma, alcohol use, and depression were not statistically significantly predictive of baseline state mindfulness. Baseline anxiety levels were predictive of baseline state mindfulness; however, unexpectedly, higher levels of

anxiety predicted higher levels of initial state mindfulness. It was hypothesized that symptoms of anxiety, particularly rumination and worry, would impact one's ability to sustain attention during the mindfulness-based intervention, subsequently reducing their state mindfulness. The research has found mixed results when looking at anxiety and mindfulness-based interventions; for example, Fumero et al.'s (2020) meta-analysis on mindfulness-based interventions conducted online and in person found reduced anxiety symptoms following the interventions, while Banerjee et al. (2018) found that anxiety hindered one's ability to cultivate state mindfulness.

The present study's findings add to the mixed results; however, a possible explanation for the findings may be the measure used for anxiety. Banerjee et al. (2018) highlighted that worry and rumination were likely the ingredients of anxiety that hindered the cultivation of state mindfulness. We used Beck's Anxiety Inventory, which is a general measure for anxiety and the total score may not have captured the severity of rumination or worry that another scale (e.g., Penn State Worry Questionnaire) may have captured. Further analyses with the present study's data may yield different results if items related to rumination and worry are parceled out to create a latent variable for anxiety. Additionally, individuals with higher levels of baseline anxiety may have been initially more motivated to engage in mindfulness as a coping mechanism, or the heightened anxiety may have served as a catalyst for the individuals to become more aware of the present moment experiences.

Hypotheses # 3: Higher Psychopathology Predicts Lower State Mindfulness Slopes and Trait Mindfulness

Hypothesis three was partially supported by our model. While trauma, alcohol, and depression were not predictive of state mindfulness' trajectory, we found individuals with higher baseline anxiety had a steeper decline or deterioration of state mindfulness over time. Thus, our

findings support the idea that heightened anxiety makes it more challenging to access state mindfulness and hinders the growth of state mindfulness during a four-week mindfulness course. In relation to the results reported above where higher anxiety predicted higher baseline state mindfulness, it is possible that as the course went on and motivation deteriorated, it became more difficult to practice mindfulness-based interventions.

Additional Findings in the Model

The final model provided results that were beyond what was hypothesized and offer more insight into the trajectory of state mindfulness. We found that individuals with previous mindfulness experience had higher initial state mindfulness levels, suggesting practice history is related to one's initial level of state mindfulness. Notably, we found non-significant connections between previous mindfulness experience and baseline trait mindfulness, the slope (i.e., growth) of state mindfulness, and final trait mindfulness, suggesting that previous mindfulness experience may not be needed for individuals to engage in and benefit from an asynchronous and online mindfulness course. Additionally, we found a non-significant correlation between the slope and intercept of state mindfulness, which may suggest that initial mindfulness level did not determine the eventual development of state mindfulness over time within this sample; individuals both high and low in state mindfulness at the beginning of the course were still able to develop higher levels of state mindfulness across the course..

In terms of psychopathology, we found the growth of state mindfulness over the course predicted reduced depression levels at the end of the course, suggesting the course may be beneficial in mitigating depression symptoms. Additionally, we found that those with higher levels of baseline trait mindfulness had lower depression scores at the end of the course, which supports Desrosiers et al. (2013) who found an inverse relationship between trait mindfulness

and depression. Lastly, baseline anxiety, alcohol use, and trauma positively predicted symptom level following the completion of the course.

Course-Related Findings/ Rurality

Mindfulness-Based Stress Reduction (MBSR) is an evidence-based course for teaching mindfulness. The present study took place in a rural community, and rural communities face various barriers to mental health treatments. Thus, in addition to testing the hypotheses, the researchers sought to determine if an asynchronous and online MBSR course is a feasible option to bring MBSR to rural communities. Recruitment of participants on the college campus, in the local, general population, and online yielded great interest, as 274 people asked to participate in the course across the year of data collection. However, adequate course participation was a major barrier during data collection, as many participants either dropped out or clicked through without engaging in the materials. Table 2.7 shows that it was expected to take participants at least 175 minutes to engage with all course materials across the four weeks; however, the average time spent across all participants was 62.36 minutes. While the average time spent on the course improved to 110.88 minutes when those who participated less than 10 minutes were removed, there is still a discrepancy between the expected time and the average time.

We do not have data to understand what led to high attrition or click through rates as there were no significant differences found between current students and community members; however, we hypothesize lack of accountability, poor motivation, and learning style may contribute. Mindfulness, like any new skill, can be challenging to learn about and practice; it is possible that lack of community support combined with other pressing life obligations may have led to poor engagement with the course. Thus, an asynchronous and online MBSR course may

need more adjustments to promote learning and practice, with materials that are more engaging and a community component to help with accountability.

A noteworthy discovery is that the size of the town one grew up in, indicating rurality, did not emerge as a statistically significant predictor in the final model for state mindfulness (intercept and slope), trait mindfulness (baseline and week 4), or psychopathology (baseline and week 4). This implies that the mindfulness content delivered to individuals in rural communities might not require significant adaptations compared to those in suburban or urban areas. Despite this, enhancing overall engagement remains crucial for the feasibility and accessibility of an online and asynchronous MBSR course. Researchers should prioritize efforts to improve participant engagement to ensure the effectiveness of mindfulness interventions, regardless of participants' geographic background.

Implications

The findings from the current study provide several implications for clinical practice and future research.

Clinical Practice

Taken together, these findings provide support that state and trait mindfulness are connected constructs: the growth of state mindfulness is related to higher levels of trait mindfulness. Thus, the practice of mindfulness may be ideal in helping clients develop trait mindfulness, as trait mindfulness is documented to protect against psychopathology and reduces psychological distress (Hayes & Feldman, 2004; Thompson et al., 2011). As mindfulness is heavily integrated in numerous psychotherapy treatment protocols, clinicians should continue to try and implement mindfulness into their psychotherapy sessions. Moreover, it may be helpful for clinicians to measure their client's baseline state and trait mindfulness to measure their

growth in these constructs over time through the course of psychotherapy, as it will help guide clinicians on the how much mindfulness psychoeducation and practice may be needed within session.

Previous research has found trait mindfulness is a protective factor against depression; thus, there is a need to finding ways to help individuals who have depression symptomology or who are susceptible to depression symptomology develop state and trait mindfulness (Carpenter et al., 2019; Desrosiers et al., 2013). For example, Lipson et al. (2022) found a 50% increase in depression symptoms within college students between 2013 and 2021. The current research discovered that as state mindfulness increased, final depression symptoms decreased. This implies that the MBSR course employed could assist individuals with depression symptoms in enhancing their state mindfulness skills over four weeks. Additionally, it is worth noting that the increase in state mindfulness is associated with elevated trait mindfulness, as mentioned earlier. As college students are particularly prone to increased depression, an online asynchronous MBSR course may be helpful in helping college students develop state mindfulness and combat depression symptoms. Colleges may wish to implement an MBSR course as part of all incoming first-year course load to ensure they have access to the skills and give them the opportunity to grow in their state mindfulness.

Our study did not identify any notable connections between the development of state mindfulness and the severity of trauma or alcohol use symptoms. It is possible that the four-week duration of the course may not be sufficient for individuals with trauma or prolonged alcohol use to experience significant changes in their symptoms over time. Additionally, Goldberg et al. (2021) found that previous adverse childhood experiences were related to an increase in unfavorable MBI occurrences, and we did not measure or control for adverse childhood

experiences; thus, it is possible that our sample contained a mixture of participants who had adverse childhood experiences and participants who did not, preventing us from finding a significant relationship between trauma level and state mindfulness growth. Moreover, in terms of alcohol use, Memelstein and Garske (2015) found that binge drinking behaviors significantly reduced after 4 weekly in-person 60 minute MBIs, and we did not find a significant relationship between the two variables; however, our results may be explained by the online asynchronous nature of the MBSR course, as an in-person component may yield more benefits. Another possible explanation for our findings between alcohol use and state mindfulness may be that the average alcohol use across participants was low (i.e., 7.84 on a scale from 0 – 46), so it is possible that the severity of alcohol use was not high enough to detect a significant relationship between alcohol use and state mindfulness growth.

Our findings suggested individuals with high baseline anxiety had high initial state mindfulness; however, we also found anxiety symptoms may interfere with one's ability to grow in state mindfulness. It is possible that those higher in mindfulness were initially interested in learning skills to cope with their symptoms allowing them to hone in on the materials during the first week. However, the effort needed to maintain mindfulness practice and continue to growth state mindfulness may have been more challenging subsequently preventing them from cultivating state mindfulness over time. Banerjee et al. (2018) found that participants with higher rumination and worry (i.e., specific symptoms of anxiety) predicted psychological disengagement; thus, individuals with higher levels of these specific anxiety-related symptoms may have had a harder time growing their state mindfulness over time.

When working with clients who have higher levels of anxiety, there is a need for more consideration on how to tailor mindfulness-based interventions in psychotherapy. As individuals

with higher anxiety may have greater difficulty with mindfulness practice, clinicians should take a more collaborative approach when working with their client, helping them find a mindfulness-based intervention that they perceive as helpful. For example, the MBSR course implemented within the present study introduced participants to six types of mindfulness interventions (i.e., mindful movement; soft, soothe, allow; body scan; walking meditation; sitting meditation; and loving-kindness meditation). Engagement with the intervention may also depend on the voice of the speaker (i.e., male versus female, or accent versus non accent) or whether the client is alone or in a group. Thus, clinicians may engage their clients in various mindfulness-based interventions in session and immediately measure the client's state mindfulness level to understand which interventions may be most helpful in growing state mindfulness. Alternatively, if clients experiencing anxiety symptoms continue to demonstrate low state mindfulness after mindfulness-based interventions, clinicians may want to consider using alternative therapeutic techniques until clients' anxiety symptoms lower before introducing mindfulness into sessions.

Research

In terms of research implications, our findings reveal that an asynchronous and online MBSR course is of interest to many individuals living within a rural area; however, modifications are needed to help improve engagement and retention. It is possible that a group or community component and more engaging materials (e.g., discussion boards, activities, etc.) may improve motivation to participate in the course. Moreover, partway through the present study, we added brief quizzes to help incentivize engagement; however, the quizzes did not appear to help with engagement as some participants either stopped engaging with the course or made use of the unlimited quiz attempts to try and find the correct combination of correct answers as evidenced by the high quiz attempt count. It appears that those who have self-

motivation are likely more equipped to engage with an online MSBR; thus, when recommending clients to a MBSR course, it may be helpful to assess their level of motivation and commitment while also having open conversations about the nature and requirements of an asynchronous online MBSR course versus a synchronous or an in person course. Learning more effective engagement strategies within different modalities of MBSR courses may also help with future research that involves MBSR courses, as the researcher can implement additional inclusionary criteria that can improve the quality of the dataset.

Limitations and Future Directions

The present study did not come without limitations, which has helped our understanding on how to improve future research that explores state and trait mindfulness using a MBSR course. The limitations observed in the present study were related to the methodology and scope of the project.

In terms of methodology, the project had limitations in the sample used, course, and trait mindfulness measure, which should be improved upon in future research. We collected data from a nonclinical sample, which may have limited our ability to clearly see significant connections between psychopathology and state and trait mindfulness. Future research may wish to recruit a clinical sample to see if there are differences in findings when using participants with more severe psychopathology levels. A few months into data collection, it became clear that participants were not engaging in the course materials and clicking through the course and surveys. To combat this, we embedded a quiz into the course that contained questions about material read or watched in the module. Adding the quiz part way through the study may have resulted in some of the initial data being invalid due to acquiescence bias. Despite adding a quiz

partway through, the study continued to face high attrition rates throughout data collection, which reduced the overall sample size.

The participants were asked to complete their weekly survey immediately after the weekly mindfulness practice embedded into the course, as this was necessary to measure state mindfulness. We cannot be sure that all participants (1) engaged in the mindfulness practice prior to taking the weekly survey or (2) that they completed the survey immediately after practicing the mindfulness meditation. Lastly, the data were collected via self-report surveys, which have inherent flaws to research, as they may have introduced various biases (i.e., social desirability, acquiescence bias, etc.). To combat these limitations, future research that implements an asynchronous MBSR course should ensure there are parameters in place to measure engagement and weed out individuals who click through the course with minimal engagement. Moreover, future research may opt to use a synchronous online or in-person course to determine if these alternate modalities improve retention and engagement.

As we analyzed our models, we could not find reasonable model fit in any models that included the slope or intercept of trait mindfulness. These findings may have been caused by an MBSR course that was not long enough to observe changes in trait mindfulness. The original MBSR course is eight-weeks long; thus, future research may wish to incorporate the entire eight-week course into their protocol to see if the growth of trait mindfulness is captured. Additionally, the measure of trait mindfulness (i.e., FFMQ) may be a limitation. Van Dam et al. (2018) noted self-report based measures of trait mindfulness are "vulnerable to limitations of introspection because participants may not know exactly which aspect of mental states should be taken into account when making personal assessments" (p. 8). Thus, it is possible that participants'

responses were an inaccurate representation of their true trait mindfulness levels across the MBSR course.

The presents study explored numerous variables and their interactions, which may have been too much for a single project. Future research may opt to explore one or two components at a time. For example, future research may focus on the development of trait mindfulness to understand an appropriate course length and what levels of trait mindfulness facets help propel or stagnant growth. Moreover, future research may narrow in on state mindfulness' trajectory to understand the ingredients of mindfulness-based interventions that may help propel growth when higher levels of anxiety are present.

Conclusion

In sum, the present study sought to understand how psychopathology would impact the growth from state to trait mindfulness when participants completed a four-week asynchronous online MBSR course. Broadly, we found the growth of state mindfulness over four weeks was linked to higher levels of week four trait mindfulness, and we found those higher in anxiety had a steeper decline of state mindfulness across the four-week course. Our results provided insights into the use of mindfulness-based interventions in clinical settings, while paving the way for future mindfulness research to explore these constructs further.

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APPENDICES

APPENDIX A

RECRUITEMENT FLYER

Volunteers who are Ages 18+ Needed for Study on Mindfulness and Mental Health

Mindfulness can improve health and well-being for individuals who practice it. Have you ever wanted to learn more about mindfulness?

Participation involves:

- A 4-week online asynchronous mindfulness course including readings, videos, and mindfulness exercises.
- A weekly survey
- Each week is estimated to take 1 – 1.5 hours to complete the course materials and survey.

Benefits:

- Learn more about mindfulness through a free structured course you can take at your own pace.
- Random drawing for 1 of 20 $50 Amazon gift cards

To learn more or be entered into the study, contact **Veronica O'Brien, vo00807@georgiasouthern.edu**

This Research was Approved by the IRB under tracking number H23168

If you would like to be entered directly into the drawing without completing the research, please go to http://tinyurl.com/2bajrass

APPENDIX B

COMMUNITY RECRUITMENT MESSAGE

Hi! My name is Veronica O'Brien, and I am a doctoral candidate in the Clinical Psychology

Doctoral Program at Georgia Southern University in Statesboro, GA. I am inviting you to

participate in the research I am completing for my dissertation (Georgia Southern University

approved # H23168).

My study explores how one's mental health impacts their ability to be mindful. To be involved in

the study, participants must be at least 18-years-old. The study includes weekly participation in a

four-week asynchronous mindfulness course. Each week, participants should plan to spend an

hour to an hour and a half on the course materials and weekly surveys.

After you complete the course, you will have the opportunity to win one of twenty $50 Amazon

gift cards.

If interested, please email me at vo00807@georgiasouthern.edu. Thank you for your cooperation

and participation in my study; it's greatly appreciated!!

APPENDIX C

Informed Consent

Mindfulness and Mental Health

The researchers affiliated with the study are Veronica O'Brien and Nicolette Rickert. Veronica is a doctoral candidate in the Clinical Psychology program at Georgia Southern University, and Dr. Nicolette Rickert is an Assistant Professor within the Psychology Department at Georgia Southern University.

This research aims to further understand how mental health relates to one's mindfulness skill development. Our goal is to identify how common mental health symptoms (e.g., anxiety, depression, trauma, and alcohol use) relate to one's ability to develop mindfulness skills.

Should you wish to participate in this research, you will be asked to complete a four-week online asynchronous course and complete a series of questions at the end of each week. We anticipate participants to spend an hour to an hour and a half on the course and survey each week. Prior to the start of the course, you will be asked to complete a longer 20-minute survey to gather information about your demographics, mental health, and mindfulness practice history. Each week you will be presented with learning materials (i.e., about 30 minutes of videos and about 10 pages of reading) related to a component of mindfulness. Then you will engage with a 20-minute mindfulness meditation. Following the mindfulness meditation, you will complete a series of questions about your experience with the mindfulness practice and your mindfulness skills.

We do not anticipate severe risks or discomfort from this research. However, you may experience boredom or fatigue from course materials or from answering questions. Should you experience distress while engaging in the course material or answering questions, we encourage you to contact the Georgia Southern University Counseling Center (912) 478-5541, or the National Alliance on Mental Illness (NAMI) hotline at 1-800-950-6264 where you can speak with a trained mental health provider.

It is possible that your participation in this research will provide information on the relationship between mental health and mindfulness, which can help researchers and therapists further understand how to apply mindfulness in therapy. You may experience some benefit from completing the mindfulness course as you will be learning a new skill or developing an existing skill. Moreover, the surveys may offer a chance of self-reflection.

Participants who complete the entire course will have the opportunity to enter themselves to receive one of twenty $50 Amazon gift cards. Additionally, proof of completion will be made available to students whose professors are offering extra credit for their participation.

The primary investigator and faculty advisor will have full access to all data collected from this study. The data will be stored on an encrypted hard drive, which will be stored in the faculty advisor's research lab, for a minimum of three years following the completion of data collection.

Both the primary investigator and faculty advisor have completed ethical training enforced by the Institutional Review Board at Georgia Southern University.

All of your information collected for this research will remain confidential and anonymous. Given this is a longitudinal design, your data will be connected following data collection. To connect your data, you will be asked to create a unique identifying code comprised of the following information: last three digits of your phone number, first letter of middle name (if none, use X), first two letters of the town you were born in, and first two letters of your birth month. The unique identifier will be used to merge data following data collection then removed from the final dataset. Additionally, if you choose you enter to win a gift card, your email will be collected, but the email will be removed from the final dataset.

You as a participant, have the right to ask any questions related to this research. Should you have any questions that the investigator or co-investigator can answer, please feel free to reach us through the contact information listed below. Should you have any questions regarding your rights as a participant in research, please contact Georgia Southern's Office of Research Services and Sponsored Programs at (912)478-0843 irb@georgiasouthern.edu.

You as a participant are not required to participate in this research and can end your participation at any time. There is no penalty for prematurely withdrawing from this research.

You must be 18 years of age or older to consent to participate in this research study. You can download a copy of this informed consent now for your records and it will be located within the course for your review. This study has been reviewed and approved by the Georgia Southern Institutional Review Board under tracking number H23168

Title of Project: Mindfulness and Mental Health
Principal Investigator: Veronica O'Brien, M.A., vo00807@georgiasouthern.edu
Research Advisor: Nicolette Rickert, Ph.D., nrickert@georgiasouthern.edu

Please select an option below to indicate whether you agree to participate in this research:

- Yes, I read the terms above and consent to participate in this research.
- No, I do not consent to participate in this research.

APPENDIX D

DEBRIEFING STATEMENT

Thank you for your participation in this research. The goal for our study is to gather information on how mental health may impact one's ability to cultivate mindfulness. We hope to use the information collected to further tailor mindfulness interventions in treatment settings. We acknowledge that answering questions may have caused discomfort or fatigue.

For support for potential distress, please contact the National Alliance on Mental Illness (NAMI) hotline at 1-800-950-6264. To be entered into the raffle to have the chance to win one of twenty $50 Amazon gift cards, please follow this link.